

A1 in Northumberland: Morpeth to Ellingham

Noise Addendum

APFP Regulation Rule 8(1)(c)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed
Forms and Procedure) Regulations 2009

January 2021

Infrastructure Planning

Planning Act 2008

**The Infrastructure Planning
(Applications: Prescribed Forms
and Procedure) Regulations 2009**

**The A1 in Northumberland: Morpeth to
Ellingham**

Development Consent Order 20[xx]

Noise Addendum

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1 NOISE ADDENDUM

1.1 EXECUTIVE SUMMARY

INTRODUCTION

- 1.1.1. An application for development consent was submitted to the Secretary of State for Transport via the Planning Inspectorate (the "Inspectorate") in June 2020 for the A1 Morpeth to Ellingham Scheme ("the Scheme"). The application was accompanied by an Environmental Statement (ES) which considered whether significant effects on the environment would be likely as a result of the Scheme. The ES included an assessment of noise and vibration effects.
- 1.1.2. Due to the postponement of the proposed Scheme opening, the opening year for assessment purposes has also been put back from 2023 to 2024, with a consequential design year of 2039. This Environmental Statement Addendum (the "Addendum") to the ES has primarily been produced to validate the operational stage noise assessment of the Scheme presented within Chapter 16: Assessment of Cumulative Effects (APP-062) for the revised opening year of the Scheme. For the purpose of the ES, the assessment of the Scheme was undertaken for an anticipated opening year of 2023 and consequential design year of 2038.
- 1.1.3. A reassessment has been undertaken for operational noise based on traffic data provided for an opening year of 2024 and a design year of 2039. There is no requirement to reappraise construction noise and vibration effects as explained in **paragraph 1.3.4**.
- 1.1.4. This Addendum comprises environmental information to be taken into account in the determination of the application for development consent. It should be read as a replacement of the operational stage assessment presented within **Chapter 6 Noise and Vibration Part A (APP-042), Chapter 6 Noise and Vibration Part B (APP-043) and Chapter 16 Assessment of Cumulative Effects (APP-062)**. A number of appendices and figures have been revised and a number of paragraphs within **Chapter 6 Noise and Vibration Part A (APP-042), Chapter 6 Noise and Vibration Part B (APP-043) and Chapter 16 Assessment of Cumulative Effects (APP-062)** have been replaced by this document, details of which are presented within paragraphs 1.2.5 to 1.2.8).

SCOPE

- 1.1.5. Although the primary purpose of the Addendum assessment is to verify the findings presented within the ES for the new opening and design years, the approach to the Addendum assessment now follows new guidance in the form of DMRB LA 111 Noise and Vibration, Revision 2, May 2020 (Ref. 1.1).
- 1.1.6. The Addendum assessment also combines the Morpeth to Felton (Part A) and Alnwick to Ellingham (Part B) schemes into the overall M2E scheme in a consistent manner where this has the potential to influence the conclusions of the assessment.

- 1.1.7. The construction stage assessments presented within Chapter 6 Noise and Vibration Part A (APP-042), Chapter 6 Noise and Vibration Part B (App-043) and Chapter 16 Assessment of Cumulative Effects (App-062) are not affected by the change in projected opening year. The framework for the assessment of construction stage noise and vibration set out in DMRB LA 111 and its predecessor (Volume 11, Section 3, Part 7, HD 213/11 Noise and Vibration (**Ref. 1.2**)) is sufficiently similar such that any reassessment of construction noise or vibration would be unlikely to change the conclusions. The construction stage assessments are appropriately undertaken within separate localised study areas with respect to Parts A and B of the scheme following the framework set out within DMRB Volume 11, Section 3, Part 7, HD 213/11 Noise and Vibration (**Ref. 1.2**). The combination of the two parts of the scheme into the overall M2E scheme would therefore not influence these study areas or the conclusions of the construction stage assessments. The construction stage assessments therefore remain valid.
- 1.1.8. This Addendum considers the operational stage noise assessment of the Scheme and supersedes the operational stage assessments presented in **Chapter 6 Noise and Vibration Part A (APP-042), Chapter 6 Noise and Vibration Part B (App-043) and Chapter 16 Assessment of Cumulative Effects (App-062)**.

ASSESSMENT FINDINGS

- 1.1.9. Within **Chapter 6: Noise and Vibration Part A (APP-042) and Chapter 16: Assessment of Cumulative Effects (APP-062)**, three significant adverse operational noise residual effects were predicted as a result of Part A of the Scheme. The updated DMRB LA 111 methodology was released subsequent to the assessments within **Chapter 6: Noise and Vibration Part A (APP-042) and Chapter 16: Assessment of Cumulative Effects (APP-062)** being undertaken. A sensitivity test was carried out to determine the implications of the updated guidance and this was reported in **Appendix 6.10 Noise and Vibration DMRB Sensitivity Test Part A (APP-215)**. The conclusion of this sensitivity test was that one additional receptor (Northgate Farm) was predicted to experience a significant adverse operational noise effect. A noise barrier was proposed in this location which would mitigate the significant effect, but it has not been confirmed whether this barrier can be constructed. Therefore, Northgate Farm was deemed to experience a significant adverse operational noise residual effect.
- 1.1.10. The Addendum assessment shows that these four properties are still predicted to experience significant adverse effects. In addition, a further six properties in the area of Fenrother are predicted to experience significant adverse operational noise effects as a result of the Scheme (see Section 1.11 Potential Impacts and in particular Table 1-30 for further details). Within **Chapter 6: Noise and Vibration Part A (APP-042) and Chapter 16: Assessment of Cumulative Effects (APP-062)**, these properties fell outside the Study Area, but even had they fallen within the Study Area they were predicted to experience a minor adverse noise level change in the short-term (a non-significant effect). These properties are now predicted to experience moderate adverse noise level changes in the short-term. Mitigation in the form of acoustic screening has been investigated for these six

receptors but these measures are considered unlikely to meet the meaningful benefit threshold of at least 3 dB for acoustic mitigation presented in **Chapter 6: Noise and Vibration Part A (APP-042)**. Therefore, the adverse operational noise residual effects at these receptors remain significant.

- 1.1.11. Within **Chapter 6: Noise and vibration Part B (APP-043)** and **Chapter 16: Assessment of Cumulative Effects (APP-062)**, the operational stage assessments applicable to Part B of the Scheme indicate that no significant adverse effects are predicted to occur. The assessment presented within this Addendum confirms this conclusion.

1.2 PURPOSE OF THE NOISE ADDENDUM

- 1.2.1. An application for development consent, which included an ES was submitted to the Secretary of State for Transport via the Inspectorate in June 2020 for the Scheme. A full description of the Scheme can be found at **Chapter 2: The Scheme of the ES (APP-037)**. The ES sets out the findings of the Environmental Impact Assessment (EIA) that was carried out for the Scheme.
- 1.2.2. The Addendum to the ES has been produced primarily to validate the assessment presented within Chapter 16: **Assessment of Cumulative Effects (APP-062)** for a revised opening year of the Scheme. For the purpose of the EIA, the assessment of the Scheme was undertaken for an anticipated opening year of 2023 and consequential design year of 2038. Due to a delay in the proposed Scheme opening, the opening year has however since been put back to 2024, with a consequential design year of 2039.
- 1.2.3. **Chapter 2 The Scheme of the ES (APP-037)**, presents the conclusions of a sensitivity analysis which was carried out on the traffic data in order to test whether the change in traffic levels would materially affect assessments for the revised opening year and design year. From this analysis it was concluded that there would likely be no material change in the outcome of those assessments that use the traffic data. The sensitivity analysis however did not include a quantitative analysis to determine how the revised traffic data may affect the operational stage road traffic noise assessment.
- 1.2.4. The primary aim of the Addendum is to confirm the findings of the traffic data sensitivity analysis for the operational stage noise assessments presented within **Chapter 6 Noise and Vibration Part A (APP-042)**, **Chapter 6 Noise and Vibration Part B (APP-043)**, and **Chapter 16: Assessment of Cumulative Effects (APP-062)** and to replace the operational stage road traffic noise assessments presented within these Chapters.
- 1.2.5. The following appendices have been revised:
- Appendix 6.2 Legislation, Policy and Guidance Part A (APP-207)
 - Appendix 6.2 Legislation, Policy and Guidance Part B (APP-277)
 - Appendix 6.5 Source Information and Assumptions for Operational Road Traffic Noise Assessment Part A (APP-210)
 - Appendix 6.5 Source Information and Assumptions for Operational Road Traffic Noise Assessment Part B (APP-280)

- Appendix 6.9 Wider Network Noise Level Changes Part A (APP-214)

1.2.6. The following figures have been revised:

- Figure 6.2 Do-Something Short Term Noise Level Change Part A (APP-080) – Replaced with Figure 4: Short-term Noise Level Change – Part A within **Appendix D: Noise Addendum Figures - Part 1**
- Figure 6.3 Do-Something Long Term Noise Level Change Part A (APP-081) – Replaced with Figure 5: Long-term Noise Level Change – Part A within **Appendix D: Noise Addendum Figures - Part 1**
- Figure 6.5 Do-Something Short Term Noise Level Change for Felmoor Park and Bockenfield Holiday Park Part A (APP-083) – Replaced with Figure 7: Short-term Noise Level Change for Felmoor Park and Bockenfield Holiday Park within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.6 Receptor Groups Part A (APP-084) – Replaced with Figure 6: Determination of Significance - Receptor Groups - Part A within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.7 Noise Level Benefits from Barrier Four Part A (APP-086) – Replaced with Figure 12: Noise Level Benefits from PNB4 within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.8 Do-Something Short Term Noise Level Change with Barrier Four Part A (APP-086) – Replaced with Figure 13: Short-term Noise Level Change for Felmoor Park and Bockenfield Holiday Park with PNB4 within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.9 Moderate Adverse Wider Network Noise Level Changes Part A (APP-087) – Replaced with Figure 11: Wider Network Noise Changes within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.1 Operational Noise Calculations Study Area Part B (APP-127) - Replaced with Figure 1: Operational Road Traffic Noise Study Area within **Appendix D: Noise Addendum Figures - Part 1**
- Figure 6.3: Do Minimum Noise Level Change Plot Part B (APP-129) – Replaced with Figure 3: Do-Minimum Noise Level Change – Part B within **Appendix D: Noise Addendum Figures - Part 1**
- Figure 6.6: Short Term Noise Level Change Part B (App-132) – Replaced with Figure 8: Short-term Noise Level Change – Part B within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.7: Long Term Noise Level Change Plot Part B (APP-133) – Replaced with Figure 9: Long-term Noise Level Change – Part B within **Appendix D: Noise Addendum Figures - Part 2**
- Figure 6.8: Determination of Significance – Receptor Groups Part B (APP-134) – Replaced with Figure 10: Determination of Significance – Receptor Groups – Part B within **Appendix D: Noise Addendum Figures - Part 2**

1.2.7. Table 1-1 sets out the paragraphs and tables within **Chapter 6 Noise and Vibration Part A (APP-042)**, and **Chapter 6 Noise and Vibration Part B (APP-043)**, which have been replaced by the Noise Addendum.

Table 1-1 - Paragraphs and Tables replaced by the Noise Addendum

Chapter 6 Noise and Vibration Part A (App-042) and Part B (APP-043) section	Paragraphs and Tables Replaced by the Noise Addendum - Chapter 6 Noise and Vibration Part A (App-042)	Paragraphs and Tables Replaced by the Noise Addendum - Chapter 6 Noise and Vibration Part B (App-043)
6.1. Introduction	Paragraph 6.1.6	-
6.2. Competent Expert Evidence	-	-
6.3. Legislative and Policy Framework	<i>Elements of the third column of Table 6-2 and 6-3 have been replaced by the Noise Addendum (where reference is made to operational road traffic impacts/effects)</i>	<i>Elements of the third column of Table 6-2 and 6-3 have been replaced by the Noise Addendum (where reference is made to operational road traffic impacts/effects)</i>
6.4. Assessment Methodology	The first sentence in paragraph 6.4.11. Paragraphs: 6.4.12 – 6.4.15 6.4.31 – 6.4.54 6.4.56 – 6.4.62 6.4.71 – 6.4.72 6.4.81 – 6.4.90 Tables 6-7, 6-10, 6-12, 6-13 and 6-14	The first sentence in paragraph 6.4.11. Paragraphs: 6.4.12 – 6.4.15 6.4.32 – 6.4.55 6.4.57 – 6.4.63 6.4.72 – 6.4.73 6.4.82 – 6.4.91 Table 6-7, 6-10, 6-12, 6-13 and 6-14
6.5. Assessment Assumptions and Limitations	Paragraphs: 6.5.12 – 6.5.20 Table 6-17	Paragraphs: 6.5.12 – 6.5.20 Table 6-17
6.6. Study Area	Paragraphs: 6.6.5 – 6.6.11	Paragraphs: 6.6.4 – 6.6.10
6.7. Baseline Conditions	Paragraphs: 6.7.3 6.7.16 – 6.7.17 6.7.18 – 6.7.21	Paragraphs: 6.7.4 6.7.25 – 6.7.26 6.7.27 – 6.7.32

Chapter 6 Noise and Vibration Part A (App-042) and Part B (APP-043) section	Paragraphs and Tables Replaced by the Noise Addendum - Chapter 6 Noise and Vibration Part A (App-042)	Paragraphs and Tables Replaced by the Noise Addendum - Chapter 6 Noise and Vibration Part B (App-043)
	6.7-24 – 6.7.32 Tables 6-20, 6-21, 6-22, 6-23 and 6-24	6.7.34 – 6.7.42 Table 6-22, 6-23, 6-24 and 6-25
6.8. Potential Impacts	Paragraphs: 6.8.33 – 6.8.64 Tables 6-27, 6-28, 6-29, 6-30 and 6-31	Paragraphs: 6.8.39 – 6.8.67 Tables 6-31, 6-32, 6-33, 6-34, 6-35, 6-36 and 6-37
6.9. Design, Mitigation and Enhancement Measures	Paragraphs: 6.9.1 – 6.9.2, 6.9.19 – 6.9.25 6.9.27 – 6.9.36	Paragraphs: 6.9.1 6.9.18 6.9.20 – 6.9.29
6.10 - Assessment of Likely Significant Effects	Paragraphs: 6.10.7 – 6.10.61 Table 6-33, 6-34, 6-35, 6-36 and 6-37	Paragraphs: 6.10.5 – 6.10.26 <i>Elements of the third column of Table 6-40 have been replaced by the Noise Addendum (where reference is made to operational road traffic impacts/effects)</i> Table 6-39
6.11. Monitoring	Paragraph 6.11.2	Paragraph 6.11.2

1.2.8. The conclusions of this Addendum supersede the combined within topic effects for noise and vibration presented within **Chapter 16: Assessment of Cumulative Effects (APP-062)** paragraphs 16.8.10 to 16.8.23. All other elements of Chapter 16 remain unaltered.

1.3 SCOPE OF THE NOISE ADDENDUM

1.3.1. In order to verify whether the change in opening year will influence the operational noise and vibration assessments presented within **Chapter 6 Noise and Vibration Part A (APP-042)**, **Chapter 6 Noise and Vibration Part B (APP-043)**, and **Chapter 16: Assessment of Cumulative Effects (APP-062)**, a re-assessment has been undertaken based on traffic data provided for an opening year of 2024 and a design year of 2039.

1.3.2. Although the primary purpose of the Addendum assessment is to verify the findings presented within the ES for the new opening and design years, the approach to the

Addendum also follows new guidance in the form of DMRB LA 111 Noise and Vibration, Revision 2, May 2020 (Ref. 1.1). The Addendum assessment also combines the Morpeth to Felton (Part A) and Alnwick to Ellingham (Part B) schemes into the overall M2E scheme in a consistent manner where this has the potential to influence the conclusions of the assessment.

- 1.3.3. Each of these aspects (the release of DMRB LA 111, and combining Parts A and B of the Scheme) are discussed further within **paragraphs 1.3.6 to 1.3.10**.
- 1.3.4. The construction stage noise and vibration assessments presented in Chapter 6 Noise and Vibration Part A (APP-042), Chapter 6 Noise and Vibration Part B (App-043) and Chapter 16 Assessment of Cumulative Effects (App-062) remain valid for the following reasons:
- The change in traffic opening year from 2023 to 2024 would have no effect on the assessment of construction noise or vibration.
 - The framework for the assessment of construction stage noise and vibration set out in DMRB LA 111 and its predecessor (Volume 11, Section 3, Part 7, HD 213/11 Noise and Vibration (**Ref. 1.2**)) is sufficiently similar such that any reassessment of construction noise or vibration would be unlikely to change the conclusions.
 - The construction stage assessments presented within **Chapter 6 Noise and Vibration Part A (APP-042)**, **Chapter 6 Noise and Vibration Part B (App-043)** and **Chapter 16 Assessment of Cumulative Effects (App-062)** are each undertaken under the framework presented within DMRB HD213/11 within separate localised study areas with respect to Parts A and B of the scheme and are unlikely to be affected by the consistent combination of the two parts of the Scheme.
- 1.3.5. This Addendum considers the operational stage noise assessment of the Scheme and supersedes the operational stage assessments presented in **Chapter 6 Noise and Vibration Part A (APP-042)**, **Chapter 6 Noise and Vibration Part B (App-043)** and **Chapter 16 Assessment of Cumulative Effects (App-062)**.

RELEASE OF LA 111

- 1.3.6. Since the assessments reported in the ES were completed, DMRB guidance has been updated. DMRB HD 213/11 (Ref. 1.2) guidance was current at the commencement of the noise and vibration assessment and throughout all the work to determine the noise and vibration effects of the Scheme. However, in November 2019, DMRB LA 111 (Ref. 1.1) was released (and revised again in May 2020), superseding DMRB HD 213/11 (Ref. 1.2). As part of the published ES, a sensitivity test was undertaken to determine whether the conclusions of the ES might potentially change as a result of the updated guidance. This sensitivity test was undertaken for a predicted opening year of 2023 (and a design year of 2038). This Addendum, adopting the new predicted opening year of 2024 (2039 design year), now incorporates a full and comprehensive assessment undertaken in accordance with DMRB LA 111 (Ref. 1.1).
- 1.3.7. The key updates to the guidance which have been included within DMRB LA 111 (Ref. 1.1) and considered within this Addendum, are discussed further within **Appendix 6.10 Noise**

and Vibration DMRB Sensitivity Test Part A (APP-215), and Appendix 6.10 Noise and Vibration DMRB Sensitivity Test Part B (APP-285). For ease of comparison with the DMRB HD 213/11 (Ref. 1.2) assessments, the Scheme Study Area was unchanged for the sensitivity tests reported in **APP-215** and **APP-285**. However, for this Addendum, the Scheme Study Area has now been updated to reflect fully the DMRB LA 111 (Ref. 1.1) guidance.

COMBINING PARTS A AND B OF THE SCHEME

- 1.3.8. The ES currently includes two separate noise and vibration chapters, one for Part A (**Chapter 6 Noise and Vibration Part A (APP-042)**) and one for Part B (**Chapter 6 Noise and Vibration Part A (APP-043)**) of the Scheme. The operational noise assessments presented in these chapters are based on traffic data for the respective individual parts of the Scheme. An assessment using the combined Scheme (Parts A and B) traffic data was also undertaken and is presented in **Chapter 16: Assessment of Cumulative Effects (APP-062)** of the ES.
- 1.3.9. As noted above (**paragraph 1.3.2**), the preparation of the Addendum has allowed the integration of the Morpeth to Felton (Part A) and Alnwick to Ellingham (Part B) Schemes into the overall M2E Scheme in a consistent manner.
- 1.3.10. Given their geographical separation, individual calculation areas have still been derived for Part A and Part B of the Scheme, with receptor specific predictions being undertaken within each. This assessment, however, uses traffic data for the whole Scheme and a single Study Area has been derived for the Scheme incorporating the individual Part A and Part B detailed calculation areas.

APPROACH TO THE ASSESSMENT

- 1.3.11. The assessment in the Noise Addendum has been carried out in line with the methodology described in the DMRB LA 111 (Ref. 1.1), using the professional judgement of the competent experts detailed within Section 1.5.

1.4 STRUCTURE OF THE NOISE ADDENDUM

- 1.4.1. This Noise Addendum includes the following:
- Noise Addendum Main Text, setting out the environmental assessment.
 - Noise Addendum Technical Appendices (including Noise Addendum Figures)
 - Appendix A: Legislation, Policy and Guidance (Document Reference 6.22.1)
 - Appendix B: Source information and Assumptions for Operational Road Traffic Noise Assessment (Document Reference 6.22.1)
 - Appendix C: Wider Network Noise Level Changes (Document Reference 6.22.1)
 - Appendix D: Noise Addendum Figures - Part 1 (Figures 1-5) (Document Reference 6.22.2)
 - Appendix D: Noise Addendum Figures - Part 2 (Figures 6-13) (Document Reference 6.22.3)

■ Executive Summary

1.5 COMPETENT EXPERT EVIDENCE

1.5.1. **Table 1-2** demonstrates that the professionals contributing to the production of this assessment have sufficient expertise to ensure the completeness and quality of this assessment.

Table 1-2 – Relevant Experience

Name	Role	Qualifications and Professional Membership	Relevant Experience
Michael Ashcroft	Author	<ul style="list-style-type: none"> – Bachelor of Science (Honours) – Incorporated Engineer (IEng) – Member of the Institute of Acoustics 	<p>Senior Consultant</p> <p>6 years' experience in consultancy and impact assessment. Other recent relevant experience includes:</p> <p>M27 junctions 4-11 Smart Motorway Environmental Assessment Report Noise and Vibration Chapter (2017 - 2018).</p>
Nicola Bolton	Author	<p>Post Graduate Diploma, Acoustics & Noise Control; 2003</p> <p>Bachelor Honours Degree, Environmental Management & Technology, University of Bradford; 2001</p> <p>Member of the Institute of Acoustics</p>	<p>Associate</p> <p>Over 19 years' experience working on a wide range of projects involving monitoring, modelling, prediction and assessment of noise and vibration. Substantial experience of managing projects including input to a wide variety of impact assessments including:</p> <p>Flore-Weedon bypass WebTAG options appraisal (2010)</p> <p>M40 noise barrier feasibility study (2016 – 2018)</p> <p>Lincoln Southern Bypass outline business case WebTAG assessment (2019)</p> <p>A630 Road Widening non-statutory environmental assessment and full business case WebTAG assessment (2019)</p>

Name	Role	Qualifications and Professional Membership	Relevant Experience
Steve Fisher	Reviewer	<ul style="list-style-type: none"> – Bachelor of Arts (Honours) – Post Graduate Diploma in Acoustics and Noise Control – Member of the Institute of Acoustics 	<p>Technical Director</p> <p>35 years' experience in consultancy and impact assessment. Other recent relevant experience includes:</p> <ul style="list-style-type: none"> – Preparation of A1 Birtley to Coal House Environmental Assessment Report Noise and Vibration Chapter (2016 – 2017). – Preparation of M3 junction 9 Environmental Assessment Report Noise and Vibration Chapter (2017 – 2018). – Overseeing M27 junctions 4-11 Smart Motorway Environmental Assessment Report Noise and Vibration Chapter (2017 – 2018).

1.6 LEGISLATIVE AND POLICY FRAMEWORK

1.6.1. This assessment has been undertaken in accordance with the following current legislation, along with national, regional and local plans and policies. Further details are provided in **Appendix A: Legislation, Policy and Guidance**.

LEGISLATION

1.6.2. The legislation documents presented in **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** remain up to date and valid. For ease of reference the summaries of the international and national legislation relevant to the potential effects on noise applicable to this Addendum have been replicated below from **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)**. The Control of Pollution Act, 1974 (Ref. 1.25) and The Environmental Protection Act 1990 (Ref. 1.26) have not been included as these are relevant only to construction noise and vibration, which is not within the scope of this Addendum.

International

Environmental Noise Directive 2002/49/EC and Environmental Noise (England) Regulations 2006 (as amended) (Ref. 1.3)

1.6.3. This Directive relates to the assessment and management of environmental noise, and it is commonly referred to as the Environmental Noise Directive (END). It promotes the implementation of a three-step process:

- Undertake strategic noise mapping to determine exposure to environmental noise.
- Ensure information on environmental noise is made available to the public.
- Establish Action Plans based on the strategic noise mapping results, to reduce environmental noise where necessary, and to preserve environmental noise quality where it is good.

Directive 2014/52/EU of the European Parliament, 2014 (Ref. 1.4)

1.6.4. This Directive published on 16 April 2014 amends Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

1.6.5. It was considered necessary to amend the 2011 Directive to strengthen the quality of the environmental impact assessment procedure, align that procedure with current best practice and other relevant legislation and policies developed by the European Union and Member States.

1.6.6. An ES prepared under this legislation should include, inter alia, a description of the likely significant effects of the project and the measures proposed to avoid, reduce or, if possible, offset any identified significant adverse effects on the environment.

National

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (Ref. 1.5)

1.6.7. EU Directive 2014/52/EU has been transposed into UK law through the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (EIA Regulations).

Environmental Noise (England) Regulations 2006 (Ref. 1.6)

1.6.8. EU Directive 2002/49/EC has been transposed into UK law as the Environmental Noise (England) Regulations 2006 (as amended). As part of this process, noise mapping has been undertaken and Noise Important Areas (NIAs) have been identified at locations where the 1% of the population that are affected by the highest noise levels are located, in order to identify the areas which, require potential action.

Noise Insulation Regulations (NIR) 1975 (as amended) (Ref. 1.7)

1.6.9. Regulation 3 imposes a duty on highway authorities to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings, subject to meeting certain criteria given in the Regulation, for new roads or carriageways.

- 1.6.10. Regulation 4 provides highway authorities with discretionary powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings for an altered road. Regulation 5 provides highway authorities with discretionary powers to undertake or make a grant in respect of the cost of undertaking noise insulation work in or to eligible buildings during construction works for a substantial period of time, but in respect of which building no duty under Regulation 3 or power under Regulation 4 has arisen.
- 1.6.11. With respect to residential properties affected by noise from new or altered highways, to qualify for such an offer, four criteria must all be fulfilled at 1 m in front of the most exposed door or window of an eligible room in the façade of a property.

NATIONAL AND LOCAL POLICY

- 1.6.12. A summary of national and local policy relevant to the potential operational effects on noise assessed within this Addendum, and compliance with relevant policy, is presented in Table 1-3 and Table 1-4 below.
- 1.6.13. Apart from the Northumberland Consolidated Planning Policy Framework, May 2020 (Version 28) (Ref. 1.12) which has been updated, the national and local policy documents discussed within **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** remain up to date and valid. For ease of reference, the policy documents and relevant policy objectives within the following tables have been reproduced from **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)**. However, the column presenting the significance of the Scheme on policy objective has been updated to refer to operational noise effects only as airborne induced traffic vibration effects and construction noise and vibration effects are not included within the scope of this Addendum (as discussed within paragraphs 1.7.2 and 1.7.3).

Table 1-3 – National Planning Policy Relevant to Noise

National Policy	Relevant Policy Objectives	Significance of the Scheme on Policy Objective
<p>National Policy Statement for National Networks (NPS NN), 2015 (Ref. 1.8)</p>	<p>“5.193 Developments must be undertaken in accordance with statutory requirements for noise. Due regard must have been given to the relevant sections of the Noise Policy Statement for England, National Planning Policy Framework and the Government’s associated planning guidance on noise.</p> <p>5.194 The project should demonstrate good design through optimisation of scheme layout to minimise noise emissions and, where possible, the use of landscaping, bunds or noise barriers to reduce noise transmission. The project should also consider the need for the mitigation of impacts elsewhere on the road... networks that have been identified as arising from the development, according to Government policy.”</p> <p>“5.195 The Secretary of State should not grant development consent unless satisfied that the proposals will meet, the following aims, within the context of Government policy on sustainable development:</p> <ul style="list-style-type: none"> - Avoid significant adverse impacts on health and quality of life from noise as a result of the new development; - Mitigate and minimise other adverse impacts on health and quality of life from noise from the new development; and - Contribute to improvements to health and quality of life through the effective management and control of noise, where possible.” <p>“5.196 In determining an application, the Secretary of State should consider whether requirements are needed which specify that the mitigation measures put forward by the applicant are put in place to ensure that the noise levels from the project do not exceed those described in the assessment or any other estimates on which the decision was based.”</p>	<p>In accordance with Paragraph 5.193 of the NPS NN, due regard has been given to the Noise Policy Statement for England (NPSE) (Ref. 1.9) and the National Planning Policy Framework (NPPF) (Ref. 1.10), as well as the associated guidance presented within Planning Practice Guidance: Noise (Ref. 1.11).</p> <p>In accordance with Paragraph 5.194 and 5.195 of the NPS NN, the Scheme has been designed as far as reasonably possible to avoid giving rise to significant observed adverse effect levels (SOAEL) for noise. Where possible, the alignment has been designed to avoid passing unnecessarily close to sensitive receptors. The surface of the road for the entire Scheme would be laid with Low Noise Surface (apart from bridge decks where Hot Rolled Asphalt would be laid).</p> <p>Consideration has been given to noise mitigation options where potential adverse impacts have been identified. Mitigation measures have been included where appropriate (refer to Section 1.12).</p> <p>Enhancement measures in the form of acoustic screening have been considered along the length of the Scheme and have been included where appropriate.</p>
<p>National Planning Policy Framework (NPPF), 2019 (Ref. 1.10)</p>	<p>“170...e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of...noise pollution....”.</p> <p>“180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:</p> <ol style="list-style-type: none"> a) mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life; b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason” 	<p>In compliance with Paragraph 170 of the NPPF, the Scheme has been designed as far as reasonably possible to minimise the number of significant adverse noise impacts.</p> <p>In compliance with Paragraph 180 of the NPPF, measures to minimise adverse noise effects at each receptor above the lowest observed adverse effect level (LOAEL) have been investigated.</p> <p>Consideration has been given to noise mitigation options where potential adverse impacts have been identified. Of these options, mitigation measures have been included where appropriate (refer to Section 1.12).</p> <p>Enhancement measures in the form of acoustic screening have been considered along the length of the Scheme and are included where appropriate.</p>

National Policy	Relevant Policy Objectives	Significance of the Scheme on Policy Objective
<p>Noise Policy Statement for England (NPSE), 2010 (Ref. 1.9)</p>	<p>Paragraph 1.7 “Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:</p> <ul style="list-style-type: none"> - Avoid significant adverse impacts on health and quality of life; - Mitigate and minimise adverse impacts on health and quality of life; and - Where possible, contribute to the improvement of health and quality of life” <p>To assist in the understanding of the terms ‘significant adverse’ and ‘adverse’, the NPSE describes the following concepts that are currently being applied to noise impacts (paragraph 2.20):</p> <p>“NOEL - No Observed Effect Level - This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.”</p> <p>“LOAEL - Lowest Observed Adverse Effect Level - This is the level above which adverse effects on health and quality of life can be detected.”</p> <p>“SOAEL - Significant Observed Adverse Effect Level - This is the level above which significant adverse effects on health and quality of life occur.”</p> <p>Values for NOEL, LOAEL and SOAEL are not stated.</p>	<p>In compliance with Paragraph 1.7 of the NPSE, the Scheme has been designed as far as reasonably possible to minimise the number of significant adverse noise effects.</p> <p>Consideration has been given to noise mitigation options where potential adverse impacts have been identified. Of these options, mitigation measures have been included where appropriate (refer to Section 1.12).</p> <p>Enhancement measures in the form of acoustic screening have been considered along the length of the Scheme and have been included where appropriate.</p>

Table 1-4 – Local Planning Policy Relevant to Noise

Local Policy	Relevant Policy Objectives	Significance of Impact of the Scheme on Policy Objective
<p>Northumberland Consolidated Planning Policy Framework. May 2020 (Version 28) (Ref. 1.12)</p>	<p>Details the planning policy documents that are currently used to determine and guide planning applications in Northumberland. There are no relevant planning policies contained in this document.</p>	<p>N/A</p>
<p>Northumberland Local Plan, Publication Draft Plan (Regulation 19), January 2019 (Ref. 1.13) and Schedule of Proposed Minor Modifications to the Publication Draft Plan (Regulation 19) (Ref. 1.14)</p>	<p>The Emerging Northumberland Local Plan – Publication Draft Plan (Regulation 19) Consultation (January 2019) is intended to replace all current District and County Council Local Plans and Core Strategy documents into a single document. Neighbourhood Plans will not be replaced and will remain of relevance when determining planning applications.</p> <p>The document has a number of policies which seek to alleviate the potential for adverse noise or vibration effects.</p> <p>The Schedule of Proposed Minor Modifications to the Publication Draft Plan (Regulation 19) (May 2019) proposes minor modifications to the Publication Draft Plan which do not materially affect the substance of the plan or its overall soundness but provides points of clarification, factual updates and modifications to typographical or grammatical errors.</p>	<p>The Scheme has been designed as far as reasonably possible to minimise the noise impacts on potentially affected sensitive receptors.</p>

Local Policy	Relevant Policy Objectives	Significance of Impact of the Scheme on Policy Objective
<p>Castle Morpeth District Local Plan 1991-2006. Adopted February 27th, 2003. Published July 2003 (Ref. 1.15) (Part of the Northumberland Consolidated Planning Policy Framework)</p>	<p>The Castle Morpeth District Local Plan has aims and objectives relating to reducing environmental impacts from roads and transport.</p>	<p>The Scheme has been designed as far as reasonably possible to avoid giving rise to SOAEL for noise. Where possible, the alignment has been designed to avoid passing unnecessarily close to sensitive receptors. The surface of the road for the entire Scheme would be laid with Low Noise Surface (apart from bridge decks where Hot Rolled Asphalt would be laid).</p> <p>Consideration has been given to noise mitigation options where potential adverse impacts have been identified. Of these options, mitigation measures have been included where appropriate (refer to Section 1.12).</p> <p>Enhancement measures in the form of acoustic screening have been considered along the length of the Scheme and are included where appropriate.</p>
<p>Alnwick District Local Development Framework. Core Strategy Development Plan Document. Adopted October 2007 (Ref. 1.16) (Part of the Northumberland Consolidated Planning Policy Framework)</p>	<p>Policy S3 sets out sustainability criteria which the Council would need to be satisfied are met before granting planning permission for new development. The fifth criterion (out of six) states that “there would be no significant adverse effects on the natural resources, environment, biodiversity, cultural, historic and community assets of the district.”</p> <p>Policy S16 sets out the strategic principles of good design which should be applied to all developments “Proposals should take full account of the need to protect and enhance local environment having regard to their layout, scale, appearance, access and landscaping...”</p> <p>Chapter 7; Objective 6: “assist in the delivery of a sustainable integrated transport system and enhance accessibility for all.”</p>	<p>The Scheme has been designed as far as reasonably possible to avoid giving rise to SOAEL for noise. Where possible, the alignment has been designed to avoid passing unnecessarily close to sensitive receptors. The surface of the road for the entire Scheme would be laid with Low Noise Surface (apart from bridge decks where Hot Rolled Asphalt would be laid).</p> <p>The assessment has considered all residential properties within the Study Area, as well as other noise sensitive receptors.</p> <p>The Scheme has been designed to minimise the number of significant adverse effects once operational.</p> <p>Consideration has been given to noise mitigation options where potential adverse impacts have been identified. Of these options, mitigation measures have been included where appropriate (refer to Section 1.12).</p> <p>Enhancement measures in the form of acoustic screening have been considered along the length of the Scheme and are included where appropriate.</p>
<p>Alnwick District Wide Local Plan. Adopted April 1997 (Ref. 1.17)</p>	<p>Aim TT1: “improve the accessibility of the residents and businesses of the District to the national transportation systems.”</p> <p>Aim TT3: “ameliorate the impact of the motor vehicle on the rural and built environment.”</p> <p>Aim TT6: “encourage the Highways Agency [now known as Highways England] to upgrade the A1 Truck Road to dual carriageway standard through the District at the earliest opportunity.”</p> <p>In the Community Development Chapter, Policy CD32 reinforces the requirement for development not to result in unacceptable environmental impacts or to cause harm to residential amenity: “planning permission will not be granted for development which would cause demonstrable harm to the amenity of residential areas or to the environment generally as a result of releases to water, land or air, or of noise, dust, vibration, light or heat.”</p>	<p>The Scheme has been designed to minimise the number of significant adverse noise effects including due regard to enhancement measures.</p> <p>The assessment has considered all residential properties within the Study Area, as well as other noise sensitive receptors.</p> <p>The appraisal of mitigation and enhancement has included consideration to both treatment at source (low noise surface) and intermediate measures (acoustic screening).</p>

HIGHWAYS ENGLAND DOCUMENTS

- 1.6.14. A summary of Highways England documents relevant to the potential effects on noise is presented in Table 1-5.
- 1.6.15. The Highways England documents discussed within **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** remain up to date and valid. For ease of reference, the documents and relevant objectives within the following tables have been reproduced from **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)**. However, the column presenting the significance of the Scheme on objectives has been updated to refer to operational noise effects only as airborne induced traffic vibration effects and construction noise and vibration effects are not included within the scope of this Addendum (as discussed within paragraphs 1.7.2 and 1.7.3).

Table 1-5 - Highways England Documents Relevant to Noise

Highways England Document	Relevant Objectives	Significance of the Scheme on Objective
Highways England Licence. Highways England, 2015 (Ref. 1.18)	Minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment and ensure this is considered at all levels of operations. In exercising its functions, the licence holder must have due regard to relevant principles and guidance on good design, to ensure that the development of the network takes account of geographical, environmental and socio-economic context.	<p>The Scheme has been designed as far as reasonably possible to minimise the number of significant adverse noise impacts.</p> <p>As detailed in the Outline Construction Environmental Management Plan (Document Reference: 7.3) low noise road surface is a committed design measure for the majority of the Scheme and therefore has been accounted for within the assessment.</p> <p>NIAs have been considered including the potential for noise enhancement measures as part of the delivery of the Scheme.</p>
Road Investment Strategy (RIS) for the 2015/16 – 2019/20 Road Period. Highways England, 2015 (Ref. 1.19)	<p>Highways England aspire to be a better neighbour to communities, such that by 2040 over 90% fewer people will be impacted by noise from the strategic road network. The RIS identifies a capacity to improve noise levels through the management and redevelopment of Highways England assets, via low noise road surfacing, noise barriers etc. and commits to investigating and mitigating at least 1,150 NIAs by the end of Road Period 1 (RP1), to help improve the quality of life of around 250,000 people living and working near the network.</p> <p>All new and improved road schemes will, therefore, be expected to utilise low noise road surfaces as a default and investigate noise attenuating barriers and other potential mitigation options, where practicable.</p>	<p>The Scheme has been designed as far as reasonably possible to minimise the number of significant adverse noise impacts.</p> <p>As detailed in the Outline Construction Environmental Management Plan (Document Reference: 7.3), low noise road surface is a committed design measure for the majority of the Scheme and therefore has been accounted for within the assessment.</p> <p>NIAs have been considered including the potential for noise enhancement measures as part of the delivery of the Scheme</p>

- 1.6.16. Each of the policy documents identified above is described in further detail in **Appendix A: Legislation, Policy and Guidance**.

1.7 ASSESSMENT METHODOLOGY

SCOPE OF THE ASSESSMENT

- 1.7.1. The following topics have been assessed in the Noise Addendum:

- Permanent traffic noise effects (including night-time noise effects).
- Cumulative effects (refer to **Section 1.17**).

- 1.7.2. As discussed above in Paragraph 1.3.4 the assessment of temporary construction noise and vibration effects presented in Chapter 6 Noise and Vibration Part A(APP-042), Chapter 6 Noise and Vibration, Part B (APP-043), and Chapter 16 Assessment of Cumulative Effects (APP-062) of the ES remain valid.

- 1.7.3. Permanent traffic nuisance effects and permanent traffic induced airborne vibration effects have not been included as these are no longer required under the DMRB LA 111 (Ref. 1.1) methodology.

CONSULTATION

- 1.7.4. No further consultation was required for the purpose of this Noise Addendum. Previously it was agreed with Northumberland County Council that the assessments would be undertaken in line with the Highways England guidance that was current at the time, DMRB HD 213/11 (Ref. 1.2). Therefore, as DMRB LA 111 (Ref. 1.1) has superseded this document, it was not considered necessary to re-consult.

METHODS OF BASELINE DATA COLLECTION

- 1.7.5. The methods of baseline data collection have not changed since publication of the ES. Therefore, the text within **Section 6.4 of Chapter 6 Noise and Vibration Part A(APP-042)** and **Chapter 6 Noise and Vibration, Part B (APP-043)** of the ES remains valid.

METHODOLOGY

Technical Guidance

- 1.7.6. DMRB LA 111 (Ref. 1.1) has been used within this assessment and replaces DMRB HD 213/11 (Ref. 1.2) and Interim Advice Note (IAN) 185/15. Updated traffic, air quality and noise advice on the assessment of link speeds and generation of vehicle data into 'speed-bands' for users of DMRB, Volume 11, Section 3, Part 1 Air Quality and Volume 11, Section 3, Part 7 Noise. Highways Agency. 2015 (Ref. 1.20). All other technical guidance applied within **Chapter 6 Noise and Vibration Part A(APP-042)**, **Chapter 6 Noise and Vibration, Part B (APP-043)**, and **Chapter 16 Assessment of Cumulative Effects (APP-062)** of the ES remain valid.
- 1.7.7. The DMRB LA 111 (Ref. 1.1) is the principal guidance document for the assessment of permanent operational impacts as a result of the Scheme. A summary of DMRB LA 111 is presented within **Appendix A: Legislation, Policy and Guidance**. Where appropriate, a

discussion of the DMRB LA 111 methodology relevant to this assessment is included in the following sections.

- 1.7.8. DMRB LA 111 includes values for the daytime and night-time operational road traffic LOAEL and SOAEL. As detailed within **Table 1-3**, the aims of the NPSE (Ref. 1.9) are to avoid significant adverse noise effects. A noise level above the SOAEL would be noticeable and disruptive and/or can cause adverse health effects. A noise level above the LOAEL but below the SOAEL, depending on other factors (e.g. habituation, design of dwellings etc) would increasingly cause behavioural changes as a result of the noise level experienced.
- 1.7.9. The term significant environmental effect is also used within the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) (Ref. 1.5) to describe an environmental effect caused by a scheme that is of sufficient magnitude that it should be considered by the decision makers. Further information regarding significance is presented from **paragraph 1.7.29** onwards.
- 1.7.10. Consequently, this assessment makes a clear distinction as to whether the Scheme:
- Complies with the NPSE (Ref. 1.9), NPPF (Ref. 1.10) and NPS NN (Ref. 1.8)
 - Gives rise to significant environmental effects under the EIA Regulations (Ref. 1.5) (i.e. whether an environmental effect is significant or not).

SENSITIVITY OF RECEPTORS

- 1.7.11. In accordance with DMRB LA 111 (Ref. 1.1), examples of sensitive receptors include dwellings, hospitals, healthcare facilities, education facilities, community facilities, Environmental Noise Directive (END) quiet areas or potential END quiet areas, international and national statutory designated sites, public rights of way and cultural heritage assets.
- 1.7.12. Existing sensitive receptors within the Study Area¹ have been identified using AddressBase Plus data² obtained in September 2020, with receptors being allocated into one of the following categories (in accordance with the DMRB LA 111 (Ref. 1.1)):
- Residential
 - Other noise-sensitive (including health, educational, religious and community uses)
- 1.7.13. All other receptors have been categorised as 'not noise sensitive' as the level or change in noise is unlikely to affect the behaviour of the people using these buildings or areas. These receptors have therefore not been included within the assessment.

¹ Further explanation of the Study Area is provided in **Section 1.9**.

² AddressBase Plus is a vector address dataset containing current properties using addresses sourced from Local Authorities, Ordnance Survey and Royal Mail. The data includes Unique Property Reference Numbers (UPRN) and contains local authority current addresses, classifications, and the OS MasterMap TOID (Topographic Identifier).

ASSESSMENT OF OPERATIONAL ROAD TRAFFIC NOISE AND VIBRATION

- 1.7.14. The DMRB LA 111 (Ref. 1.1) provides guidance on the assessment of road traffic noise and vibration from new road projects.
- 1.7.15. In accordance with the DMRB LA 111 guidance, the operational road traffic noise assessment has been based on calculated noise levels using the methodology detailed in the Department of Transport and Welsh Office (1988) Calculation of Road Traffic Noise (CRTN) (Ref. 1.21) and Appendix A of DMRB LA 111 (Ref. 1.1). The traffic data used for noise calculations has been subject to the speed pivoting process set out in DMRB LA 111 Appendix A.
- 1.7.16. CRTN (Ref. 1.21) presents a methodology for the calculation of road traffic noise based on road related factors (such as gradient and surface type) and traffic related factors (such as flow, speed and the proportion of heavy duty vehicles). The propagation of noise is also covered in CRTN and can influence the noise levels at receptor locations.
- 1.7.17. In accordance with the DMRB LA 111 (Ref. 1.1), noise change due to the Scheme has been determined for all identified sensitive receptors within the operational road traffic noise study area for the following comparisons:
- Short-term – do-minimum opening year (2024) v do-something opening year (2024);
 - Long-term – do-minimum opening year (2024) v do-something future year (2039); and
 - Non-project noise change: do-minimum opening year (2024) compared against do-minimum future year (2039).
- 1.7.18. The significance of predicted noise levels and noise level change has been determined in accordance with the guidance presented within DMRB LA 111.

Night-time Noise Assessment

- 1.7.19. The DMRB LA 111 (Ref. 1.1) suggests that the assessments can consider not just the daytime period in terms of $LA_{10,18h}$, but also the night-time period in terms of L_{night} .
- 1.7.20. The L_{night} has been determined using method 3 identified in TRL report 'Converting the UK traffic noise index $LA_{10,18h}$ to EU noise indices for noise mapping' (Ref. 1.22). The TRL report presents methods for converting the $LA_{10,18h}$ noise index to L_{day} , $L_{evening}$ and L_{night} indices. The TRL report presents equations for three potential methods of conversion, depending on the traffic data available (further details are provided in **Appendix A: Legislation, Policy and Guidance**).
- 1.7.21. Taking the methodology presented within the TRL report and given that detailed hourly traffic data is not available, method 3 has been identified as being the most appropriate for adoption within noise level calculations. The TRL report presents conversion equations for two different road types: motorway and non-motorway. In this case, as none of the roads in the Study Area are motorways, all calculations to determine the L_{night} have utilised the non-motorway correction.

Representative Noise Levels at Buildings

- 1.7.22. The noise levels calculated are façade levels for buildings during the 18-hour period 06:00 to midnight (1 m from the external façade) and free-field levels incident on the façade of buildings during the 8-hour night-time period 23:00 to 07:00. The majority of levels are calculated at a default height of 4.0 m relative to the surrounding ground level. However, for some single-storey buildings, where online satellite and street view imagery clearly show that the building only has one storey, the noise level has been calculated at a height of 1.5 m relative to the surrounding ground level. Open spaces are assessed in terms of free-field noise levels at 1.5 m above the ground.
- 1.7.23. Where a building is predicted to experience different changes in noise level on different façades, the greatest magnitude of change in noise has been reported. Hence:
- When all façades show a decrease in noise level, the largest decrease has been reported.
 - When all façades show an increase in noise level, the largest increase has been reported.
 - Where façades show both increases and decreases in noise level, the largest absolute change in noise level (either increase or decrease) has been reported.
 - For the assessment of short-term and long-term do-something noise level changes, where the greatest magnitude of noise change is equal on more than one façade, the façade experiencing the greatest magnitude of noise change and highest do-something noise level has been selected.
 - For the assessment of long-term do-minimum noise level changes, where the greatest magnitude of noise change is equal on more than one façade, the façade experiencing the greatest magnitude of noise change and highest future year do-minimum noise level has been selected.
- 1.7.24. When assessing against SOAEL and LOAEL categories, (See **paragraph 1.7.30** and **Table 1-8**) the highest noise level predicted on any façade of a building has been reported.

Existing Noise Barriers and Bunds

- 1.7.25. No existing noise barriers or bunds were identified along the existing A1 and, as such, no existing noise mitigation was modelled in the Do-Minimum opening or design year scenarios.

Other Developments Represented in the Traffic Data

- 1.7.26. The following other developments were represented in all the traffic data scenarios (Do-minimum (without the Scheme)) and (Do-something (with the Scheme)) used in the noise assessment (further details are provided in the **Case for the Scheme (APP-344)**):
- A1 Coal House to Metro Centre.
 - A1 Scotswood to North Brunton.
 - A1 Birtley to Coal House.
 - A19/A1058 Coast Road.
 - A19/A184 Testo's and Downhill Lane.

- A19 Norton to Wynyard.
- Morpeth Northern Bypass.
- Reopening of B6342 bridge over River Coquet in Rothbury.
- Blyth Relief Road.
- Junction 12 A1 North Brunton roundabout improvements, extra lanes and Rotary Way widening.

Noise Insulation Regulations

1.7.27. It is the Applicant’s policy to exercise its powers under the NIR (Ref. 1.7). To qualify for compensation under the NIR , the following four criteria must all be fulfilled at 1 m in front of the most exposed door or window of an eligible room (including living rooms and bedrooms) in the façade of a property:

- Be within 300 m of the Scheme
- Show a relevant noise level (the noise level in the future year with the scheme) of at least 68 dB LA10,18h (façade)
- Show a noise increase between the relevant noise level and the prevailing noise level of at least 1 dB(A)
- The contribution to the increase in the relevant noise level from the Scheme must be at least 1 dB(A)

1.7.28. The prevailing noise level is that caused by traffic using any highway immediately before works to construct or alter the highway are commenced. However, due to the relatively short duration of the construction works for the Scheme, the prevailing noise level is taken to be equivalent to the noise level in the Do-Minimum opening year scenario. **Table 1-6** shows the parameters used to determine eligibility under the NIR, whilst **Table 1-7** shows the NIR eligibility conditions.

Table 1-6 – Noise Levels Predicted for the NIR

NIR Definition [1]	Parameter used in this Section
Prevailing noise level (PNL)	LA10,18h Do-Minimum opening year 2024 [2]
Relevant noise level (RNL)	LA10,18h Do-Something future year 2039
Maximum noise level from altered highways within 15 years (L'A)	LA10,18h Do-Something future year 2039 from the Scheme
Maximum noise level from all other highways within 15 years (L'B)	LA10,18h Do-Something future year 2039 from all the roads outside the Scheme

Notes:

[1] The associated acronyms are included for the NIR definitions.

[2] Strictly the prevailing level relates to the time immediately before the works to construct or improve the highway were begun, not the year of opening. Consequently, any assessment of eligibility in terms of the NIR must be seen as preliminary.

Source: Noise Insulation Regulations 1975 (as amended)

Table 1-7 – Criteria to Define a Property Qualifies for Insulation under the NIR

Provision	Criteria [1]
NIR 7(1)	Distance \leq 300 m from the nearest point of the carriageway
NIR 2(1) / 4(1)	RNL \geq 68 dB LA _{10,18h} façade (with 67.5 dB rounded up)
NIR 3(2)a / 4(2)b	RNL – PNL \geq +1 dB(A)
NIR 3(2)b / 4(2)b	RNL – L'B \geq +1 dB(A)

Note:
[1] For the acronyms refer to CRTN, Annex 1.
Source: Noise Insulation Regulations 1975 (as amended).

SIGNIFICANCE OF EFFECT

- 1.7.29. For the operational road traffic noise assessment, the significance level attributed to each effect has been assessed based on the guidance presented within LA 111 (Ref. 1.1).
- 1.7.30. The following effect level criteria, defined in DMRB LA 111, apply to all identified noise sensitive receptors within the operational road traffic noise study area, for the time periods when they are in use:

Table 1-8 – Operational Noise LOAELs and SOAELs (from DMRB LA 111 Table 3.49.1)

Time period	LOAEL	SOAEL
Day (06:00 – 24:00)	55 dB LA _{10,18hr} façade	68 dB LA _{10, 18hr} facade
Night (23:00 – 07:00)	40 dB L _{night, outside} (free-field)	55 dB L _{night, outside} (free-field)

- 1.7.31. Noise change due to the Scheme has been determined for:
- Short-term – do-minimum opening year (2024DM) v do-something opening year (2024DS);
 - Long-term – do-minimum opening year (2024DM) v do-something design year (2039DS); and
 - Non-project noise change: do-minimum opening year (2024DM) compared against do-minimum design year (2039DM).

- 1.7.32. The magnitude of change for the above comparisons is defined in accordance with **Table 1-9** and **Table 1-10** for the short-term and long-term respectively as adopted from DMRB LA 111 Tables 3.54a and 3.54b.

Table 1-9 – Magnitude of Change – Short Term

Short term magnitude	Short term noise change (dB LA10,18hr or Lnight)
Major	Greater than or equal to 5.0
Moderate	3.0 to 4.9
Minor	1.0 to 2.9
Negligible	Less than 1.0

Table 1-10 – Magnitude of Change – Long Term

Long term magnitude	Long term noise change (dB LA10,18hr or Lnight)
Major	Greater than or equal to 10.0
Moderate	5.0 to 9.9
Minor	3.0 to 4.9
Negligible	Less than 3.0

- 1.7.33. Considering the short-term impact magnitudes presented above, the initial assessment of likely significant effect is determined using the following table.

Table 1-11 – Initial Assessment of Operational Noise Significance

Significance	Short term
Significant	Major
Significant	Moderate
Not Significant	Minor
Not Significant	Negligible

- 1.7.34. Where the magnitude of change in the short-term is negligible, it is concluded that predicted noise level changes are not significant.

1.7.35. Where the magnitude of change in the short-term is minor, moderate or major, **Table 1-12** (reproduced from DMRB LA 111 Table 3.60) is used together with the output of **Table 1-11** to determine final significance.

Table 1-12 – Determining Final Operational Significance on Noise Sensitive Buildings

Local circumstance	Influence on significance judgement
Noise level change (is the magnitude of change close to the minor/moderate boundary?)	1) Noise level changes within 1 dB of the top of the 'minor' range can indicate that it is more appropriate to determine a likely significant effect. Noise level changes within 1 dB of the bottom of a 'moderate' range can indicate that it is more appropriate to consider a change is not a likely significant effect.
Differing magnitude of impact in the long term to magnitude of impact in the short term	1) Where the long term impact is predicted to be greater than the short term impact, it can be appropriate to conclude that a minor change in the short term is a likely significant effect. Where the long term impact is predicted to be less than the short term it can be appropriate to conclude that a moderate or major change in the short term is not significant. 2) A similar change in the long term and non-project noise change can indicate that the change is not due to the project and not an indication of a likely significant effect.
Absolute noise level with reference to LOAEL and SOAEL (by design this includes sensitivity of receptor)	1) A noise change where all do-something absolute noise levels are below SOAEL requires no modification of the initial assessment. 2) Where any do-something absolute noise levels are above the SOAEL, a noise change in the short term of 1.0dB or over results in a likely significant effect.
Location of noise sensitive parts of a receptor	1) If the sensitive parts of a receptor are protected from the noise source, it can be appropriate to conclude a moderate or major magnitude change in the short term and/or long term is not a likely significant effect. 2) Conversely, if the sensitive parts of the receptor are exposed to the noise source, it

Local circumstance	Influence on significance judgement
	<p>can be more appropriate to conclude a minor change in the short term and/or long term is a likely significant effect.</p> <p>3) It is only necessary to look in detail at individual receptors in terms of this circumstance where the decision on whether the noise change gives rise to a significant environmental effect is marginal.</p>
Acoustic context	<p>1) If a project changes the acoustic character of an area, it can be appropriate to conclude a minor magnitude of change in the short term and/or long term is a likely significant effect.</p>
Likely perception of change by residents	<p>1) If the project results in obvious changes to the landscape or setting of a receptor, it is likely that noise level changes would be more acutely perceived by the noise sensitive receptors. In these cases, it can be appropriate to conclude that a minor change in the short term and/or long term is a likely significant effect.</p> <p>2) Conversely, if the project results in no obvious changes for the landscape, particularly if the road is not visible from the receptor, it can be appropriate to conclude that a moderate change in the short term and/or long term is not a likely significant effect.</p>

1.7.36. For noise-sensitive areas (i.e. those not associated with a building), the proportion of the site falling within magnitude of change bands has been considered. The overall judgement of significance has been assessed by balancing the predicted noise levels with the importance of the site and the likely duration of exposure.

1.8 ASSESSMENT ASSUMPTIONS AND LIMITATIONS

1.8.1. **Appendix B: Source Information and Assumptions for Operational Road Traffic Noise Assessment** provides details of the assumptions and the source of the information used in the operational road traffic noise model which has been generated using CadnaA noise modelling software. **Table 1-13** provides a summary of limitations relating to the operational road traffic assessment.

Table 1-13 – Limitations in Relation to the Operational Road Traffic Assessment

Parameter	Description
Future development	The impact of the Scheme on future developments within the operational detailed calculation area has been considered in Section 1.11 .
Pavement	Pavement corrections are dependent on road surface type, speed and proportion of coverage (further detail is provided in paragraph 1.8.2 to 1.8.8). The corrections adopted are limited by the information available on existing and proposed road surface type.
Road speeds	It is recognised that the correction for speed within the CRTN method (Ref. 1.17) is only valid within the range 20 – 130 km/h. The speeds associated with the provided traffic data have therefore been limited to this range.
Traffic flows	Roads with flows in any of the assessment scenarios that fall below 1,000 18-hour Annual Average Weekday Traffic (AAWT) have been excluded from the prediction exercise. This is based on the guidance in CRTN (Ref.1.17).
	The results of the traffic modelling undertaken to inform the design of the Scheme have been used as the basis for assessment of road traffic noise. In applying the provided traffic data, a number of assumptions have been incorporated, the details of these assumptions are presented in Appendix B: Source Information and Assumptions for Operational Road Traffic Noise Assessment

EXISTING AND FUTURE PAVEMENT

- 1.8.2. The noise levels produced by a particular section of road are dependent to an extent on the road surface that is present. A ‘surface correction’ is applied to each road segment, which is dependent on the speed of the road, the road surface type and texture depth.
- 1.8.3. Where the speed of a road is less than 75 km/h, the noise produced is less dominated by tyre noise and, therefore, the road surface correction is not dependent on the road surface type.
- 1.8.4. Conversely, where the speed of the road is greater than 75 km/h, tyre noise becomes more dominant and, therefore, the road surface correction is dependent on the type of surface.
- 1.8.5. For the existing Do-minimum scenario, in line with **Chapter 2 The Scheme (APP-037)**, the following has been assumed:
- Latest available road surface information for the A1 included sections of Hot Rolled Asphalt (HRA) and Low Noise Surface (LNS). This information was provided via Highways England Pavement Management System (HAPMS).

- The local road network (the road network maintained by the Local Authority) would be surfaced with HRA. Detailed information on the type of road surface laid on the wider road network was not available and so this is assumed to be HRA, as this is the most widely applied road surface³.

1.8.6. In line with **Chapter 2 The Scheme (APP-037)** for the Do-something scenarios, the following has been assumed:

- The entire length of the A1, between the north and south extent of Part A of the Scheme and north and south extent of Part B of the Scheme, would be laid with a LNS, apart from on structures (River Coquet Bridge, Parkwood Subway, Burgham Park Underbridge and Charlton Mires overbridge) where HRA would be laid.
- All existing sections of LNS on the A1 beyond the Order Limits would remain.
- Where the 'de-trunked' A1 would become NCC's responsibility, the road surface type would remain the same as existing for the Do-something opening and future years.
- The road surface type on the local authority road network would not change.

1.8.7. A LNS has higher noise absorption characteristics than alternative surfaces such as HRA and as such absorbs a proportion of the tyre noise. For this reason, it is only effective where tyre noise is dominant over engine noise.

1.8.8. The surface corrections that have been applied within the assessment are those stated for use within Appendix A of the DMRB LA 111 (Ref. 1.1).

1.9 STUDY AREA

1.9.1. The operational road traffic noise Study Area has been defined drawing upon guidance contained within DMRB LA 111 (Ref. 1.1) as follows:

- The area within 600 m of any new road links or road links physically changed by the project; and
- The area within 50 m of other road links with the potential to experience a short-term Basic Noise Level (BNL)⁴ change of more than 1.0 dB as a result of the project.

1.9.2. The approach to defining the study area in DMRB LA 111 is different to that set out in DMRB HD 213/11 (Ref. 1.2). HD 213/11 starts with a 1 km boundary around new routes or existing routes that are being bypassed or improved. Within the 1 km boundary, a further 600 m boundary is then drawn around all the new or improved routes as well as any other

³ Assessment of noise levels from the wider road network is predominantly based on the noise level change between scenarios. Therefore, provided the road surface does not change between the scenarios it is not of great consequence to the overall assessment.

⁴ The Basic Noise Level is described in the CRTN. It does not relate to any specific receptor, but rather is a measure of source noise, at a reference distance of 10 m from the nearside carriageway edge of a specific length of highway. It is determined by obtaining the estimated noise level from the 18-hour traffic flow and then applying corrections for vehicle speed, percentage of heavy vehicles, gradient and road surface as described in CRTN.

affected route⁵. Whilst there may be some similarities between the HD 213/11 600 m buffer and LA 111 600 m buffer, the HD 213/11 guidance can result in a different study area.

- 1.9.3. This difference along with adopting a consistent definition of the Scheme when integrating Part A and Part B has resulted in the assessment in this Addendum having a different study area to that adopted in the ES. This, in turn, has led to a change in the number of receptors included within the operational road traffic noise assessment. The area most notably affected by this is the southern end of Part A, where, cautiously, additional receptors have been included within the Study Area, as a result of the new access track to the south of the Scheme.
- 1.9.4. As more receptors overall are now included in the Study Area for the Scheme in this Addendum assessment, this is considered a more cautious Study Area than that previously utilised in **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)**.
- 1.9.5. DMRB LA 111 (Ref. 1.1) does allow for the Operational Road Traffic Noise Study Area to be reduced or increased if considered appropriate. However, for this Scheme, this is unnecessary as the Study Area is considered to be of sufficient extent to encompass all receptors that are likely to be significantly affected by the Scheme. Receptors that are no longer included in the Addendum Study Area are considered unlikely to experience a significant adverse effect.
- 1.9.6. Given the geographical separation of Parts A and B of the Scheme, it is not appropriate to undertake detailed noise modelling for a single area covering both parts of the Scheme. Therefore, individual detailed calculation areas have been derived for Part A and Part B of the Scheme, within which receptor specific noise level predictions have been undertaken.
- 1.9.7. The Operational Road Traffic Noise Study Area has also been defined by the extent of the TRA such that any sensitive receptors that lie outside of the TRA have been excluded from the assessment as the noise levels and associated changes at these receptors would be considered potentially unreliable.
- 1.9.8. The operational road traffic noise study area is presented within Figure 1: Operational Road Traffic Noise Study Area within Appendix D: Noise Addendum Figures - Part 1

1.10 BASELINE CONDITIONS

- 1.10.1. The baseline noise and vibration conditions as described within **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** of the ES are not expected to have materially altered from those presented in the ES. However, some changes to the baseline section of the assessment have necessarily resulted due to

⁵ An affected route is where there is the possibility of a change of 1 dB LA_{10,18h} or more in the short-term or 3 dB LA_{10,18h} or more in the long-term.

the influence of the DMRB LA 111 guidance, for example, associated changes to the Scheme Study Area. These changes are discussed in greater detail in the following sections. In addition, changes to the future baseline have resulted due to the delay in the projected opening year of the scheme.

NOISE SURVEY

- 1.10.2. The noise surveys undertaken and reported within **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** of the ES have not altered and therefore remain valid.

ACOUSTIC MODEL AMBIENT NOISE

- 1.10.3. To account for the potential contribution from sources not included in the acoustic model or excluded from the calculation (for example, as a result of the vehicle flow falling below the threshold for valid calculations of $L_{A10,18h}$), corrections for existing ambient noise have been applied. This is especially relevant for more remote locations away from existing roads, where the noise model may be less accurate, (e.g. due to lower road traffic noise levels and the contribution of noise sources other than road traffic which are not incorporated within the noise model) and there is potential to under-estimate noise levels. The corrections which have been applied are sufficiently low not to affect the noise levels in areas where road traffic noise is dominant but have been applied to help ensure that the existing noise levels in more remote areas are not underestimated and hence that the future changes in noise levels are not overestimated.
- 1.10.4. Corrections for existing ambient noise are addressed separately for Parts A and B of the Scheme in **paragraph 1.10.5** and **1.10.6** respectively. The corrections applied are based on the noise levels measured during the noise surveys for Part A and Part B. The corrections are therefore different for the two parts of the Scheme.

Part A of the Scheme

- 1.10.5. Measurement position LT2 (See **Chapter 6 Noise and Vibration Part A (APP-042)**) was located over 500 m from the A1 and any other major road noise sources. To avoid overestimating the contribution of general ambient noise, underlying noise levels were determined for day and night-time periods and the following noise levels were subsequently added to the noise model: 39 dB for the daytime and 29 dB for the night-time (after converting to $L_{night, outside}$ using TRL (Ref. 1.22) method 3)).

Part B of the Scheme

- 1.10.6. The typical underlying noise levels for day and night-time periods were determined by analysing collected baseline noise measurement data at all Part B measurement locations (See **Chapter 6 Noise and Vibration Part B (APP-043)**), with greatest consideration given to locations at which the lowest typical L_{A90} noise levels were recorded. The following noise levels were added to the noise model: 35 dB for the daytime and 25 dB for the night-time (subsequent to conversion to $L_{night, outside}$ using TRL (Ref. 1.22) method 3)).

SENSITIVE RECEPTORS

AddressBase Receptors

- 1.10.7. Updated AddressBase Plus data have been used to ensure that noise and vibration sensitive receptors are as representative as they can be of the current situation. **Table 1-14** and **Table 1-15** detail the number of receptors that have been identified within the detailed calculation areas for Part A and Part B of the Scheme respectively. The numbers of receptors in these tables differ from the number of receptors assessed within **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** in part due to the changes in the derivation of the detailed calculation area (as discussed in **Section 1.9**) but also as a result of the updated AddressBase data used for the Addendum assessment.

Table 1-14 – Noise Sensitive Receptors – Part A Detailed Calculation Area

Receptor Type	Number of Receptors	Receptor Name / Description
Residential	596	-
Other noise-sensitive – School	1	Tritlington C of E First School
Other noise-sensitive – Hospital	2	Northgate Hospital (two buildings) ¹
Other noise-sensitive – Holiday Let/ accommodation/ short-term let	4	The Oak Inn, Cowslip Cottage and two Oakwood Holiday Cottages
Other noise-sensitive – Animal/Veterinary facility	5	Morpeth Equine Centre, The Fairmoor Centre, Fairmoor Veterinary Centre, Fivehills Boarding Cattery, Northumberland Canine Centre
Other noise-sensitive – Racquet sports facility	1	Tennis Court
Other noise-sensitive – Cemetery/ Burial Ground	2	Fairmoor Cemetery and Burial Ground west of Eshott Airfield and east of the A1 (Northumberland Woodland Burials) ²

Receptor Type	Number of Receptors	Receptor Name / Description
Other noise-sensitive – Commercial Leisure Facility	2	Felton Park Rifle Range and Eshott Heugh Paintballing Site

Note 1: Whilst Northgate Hospital consists of a number of separate buildings, as it is unclear which of these buildings are in use, noise levels for the purpose of this assessment have only been predicted at the two buildings with AddressBase postal records. The noise level predictions for these two buildings are deemed representative of the entire Northgate Hospital campus.

Note 2: As the Burial Ground is an external area with no building to predict noise levels at, the site is not included in the results tables which follow and is instead discussed in terms of the noise levels predicted to affect the whole area.

Felmoor Park and Bockenfield Holiday Park

- 1.10.8. South of Eshott Airfield lies Bockenfield Holiday Park and Felmoor Park with approximately 180 units, based on satellite imagery. From an online internet search, a number of these homes are rented-out as holiday homes. However, AddressBase information identifies that several of the units serve as first or second homes.

Table 1-15 – Noise Sensitive Receptors – Part B Detailed Calculation Area

Receptor Type	Number of Receptors	Receptor Name / Description
Residential	63	-
Other noise-sensitive – Holiday let/ accommodation/ short-term let.	8	Heckley Cottage, The Chalet Rock Lodge, 4 The Cottages, The Old Reading Rooms, Watermill Cottage, Rock Moor House, 10 The Cottages, Charlton Hall
Other noise-sensitive – Museum / gallery.	1	North Charlton Farm, The Armstrong Family and Farming Museum.
Other noise-sensitive – Racquet sports facility.	1	Tennis Court
Other noise-sensitive – Equestrian.	1	Riding Centre, Rock Moor House

Receptor Type	Number of Receptors	Receptor Name / Description
Other noise sensitive – Boarding kennels	1	Patterson Cottage Boarding Kennels

Noise Important Areas

- 1.10.9. The current Noise Action Plan for roads (Ref. 1.23) outlines NIAs at Round 3 of the UK noise mapping project, identified in accordance with the requirements of the EU Environmental Noise Directive (Ref. 1.3) and associated English Regulations. NIAs are locations where it has been identified that the 1% of the population that are affected by the highest noise levels are located, in order to identify the areas that require potential action to reduce noise levels.

Part A Detailed Calculation Area

- 1.10.10. The Round 3 NIAs within or partially within the Part A detailed calculation area are tabulated below in Table 1-16 and shown on Figure 1: Operational Road Traffic Noise Study Area within Appendix D: Noise Addendum Figures - Part 1.

Table 1-16 – Noise Important Areas – Part A

NIA ID	Description	Owner/Responsible Body
IA_ID 10003	Northgate Farm	Highways England
IA_ID 10002	Causey Park	Highways England

Part B Detailed Calculation Area

- 1.10.11. There are no NIAs falling within the Part B detailed calculation area. The closest NIA is IA_ID 10001 located on the A1 at Ellingham Lodge at a distance of approximately 3.8 km to the north of the northern end of the Part B detailed calculation area.

Designated Areas and Footpaths

Part A Detailed Calculation Area

- 1.10.12. **Table 1-17** details the designated area receptors and key public rights of way⁶ that are located within the Part A detailed calculation area.

⁶ A 'key' public right of way has been defined as a national trail or long-distance path as identified from OS LandRanger mapping. It does not include other rights of way such as footpaths, bridleways or footways (pavements) etc.

Table 1-17 – Designated Areas and Key Public Rights of Way

Receptor Type	Category	Name and Location
Designated Areas	SSSI	River Coquet and Coquet Valley Woodlands
Public Right of Way	Long distance path	St Oswald’s Way

1.10.13. The locations of these areas are shown on **Figure 2.2 Environmental Constraints Plan: Part A** of the ES (**APP-066**).

Part B Detailed Calculation Area

1.10.14. A review of designated area receptors, and key public rights of way, has identified that there are no such receptor types within the Part B detailed calculation area.

FUTURE BASELINE

Future Year (2039), Without the Scheme

1.10.15. The operational stage road traffic noise assessment relies primarily on an appraisal of predicted road traffic noise levels. A detailed noise modelling exercise has therefore been undertaken. Table 1 in **Appendix B: Source Information and Assumptions for Operational Road Traffic Noise Assessment** details the approach adopted in the completion of this noise modelling and prediction work. The road traffic data adopted within the noise model is discussed in **7.1 Case for the Scheme (APP-344)**.

Part A Detailed Calculation Area

1.10.16. The DM2039 noise model has been used to determine the future baseline noise levels within the Part A detailed calculation area.

1.10.17. **Table 1-18** and **Table 1-19** compare the number of noise sensitive receptors in the DM2024 scenario that are above the LOAEL and SOAEL thresholds (Refer to **Table 1-8**) with those in the DM2039 scenario.

Table 1-18 – Number of Dwellings above the LOAEL and SOAEL Thresholds in DM2024 and DM2039 – Part A

Noise Level	Daytime			Night-time		
	DM2024	DM2039	Difference	DM2024	DM2039	Difference
Equal to / greater than SOAEL	54	59	+5	55	61	+6
Between LOAEL and SOAEL	334	368	+34	502	503	+1
Below LOAEL	208	169	-39	39	32	-7

Table 1-19 – Number of Other Sensitive Receptors above the LOAEL and SOAEL Thresholds in DM2024 and DM2039 – Part A

Noise Level	Daytime			Night-time		
	DM2024	DM2039	Difference	DM2024	DM2039	Difference
Equal to / greater than SOAEL	2	2	0	2	2	0
Between LOAEL and SOAEL	10	11	+1	9	9	0
Below LOAEL	4	3	-1	0	0	0

NOTE: The following receptors were not considered noise-sensitive during the night-time and are therefore not reported for this period: Felton Park Rifle Range, Eshott Heugh Paintballing Site, Tritlington C of E First School, Fairmoor Cemetery and the Tennis Court.

- 1.10.18. Without the Scheme, it can be seen that the future year shows a very slight worsening in noise levels at a small number of receptors with there being fewer receptors below the LOAEL and more receptors between the LOAEL and SOAEL and above the SOAEL.
- 1.10.19. In line with the guidance in DMRB LA 111 (Ref. 1.1), consideration has been given to the change in noise levels that would arise at identified receptors, in the long-term, without the Scheme (i.e. DM2024 and DM2039).
- 1.10.20. **Figure 2: Do Minimum Noise Level Change – Part A** within **Appendix D: Noise Addendum Figures - Part 1** presents a noise level change contour map for this comparison showing the areas where noise level increases and decreases are predicted to arise in the absence of the Scheme.
- 1.10.21. **Table 1-20** presents the numbers of receptors within the Part A Detailed Calculation Area subject to different noise level changes for the long-term scenario without the Scheme. In accordance with DMRB LA 111, the assessment has been based on the façade point that is subject to the greatest magnitude of change in noise.

Table 1-20 – Noise-Sensitive Receptors, Long-term Noise Changes without the Scheme

Change in Noise Level	Magnitude of Impact	Daytime		Night-time	
		Number of Dwellings	Number of other Noise-Sensitive Receptors	Number of Dwellings	Number of other Noise-Sensitive Receptors
0.1 – 2.9	Negligible	565	13	567	8

Change in Noise Level		Magnitude of Impact	Daytime		Night-time	
			Number of Dwellings	Number of other Noise-Sensitive Receptors	Number of Dwellings	Number of other Noise-Sensitive Receptors
Increase in noise level L _{A10,18h} / L _{night}	3 – 4.9	Minor	1	0	0	0
	5 – 9.9	Moderate	0	0	0	0
	>=10	Major	0	0	0	0
No change	= 0	No change	1	0	2	0
Decrease in noise level L _{A10,18h} / L _{night}	0.1 – 2.9	Negligible	29	3	27	3
	3 – 4.9	Minor	0	0	0	0
	5 – 9.9	Moderate	0	0	0	0
	>=10	Major	0	0	0	0

NOTE: The following other sensitive receptors were not considered noise-sensitive during the night-time and are therefore not reported for this period: Felton Park Rifle Range, Eshott Heugh Paintballing Site, Tritlington C of E First School, Fairmoor Cemetery and the Tennis Court.

1.10.22. **Table 1-20** shows that the majority properties are predicted to experience a negligible increase in noise levels in the future year as a result of natural traffic growth.

Part B Detailed Calculation Area

1.10.23. The DM2039 noise model has been used to determine the future baseline noise levels within the Part B detailed calculation area.

1.10.24. **Table 1-21** and **Table 1-22** compare the number of noise sensitive receptors in the DM2024 scenario that are above the LOAEL and SOAEL thresholds (Refer to **Table 1-8**) with those in the DM2039 scenario.

Table 1-21 – Number of Dwellings above the LOAEL and SOAEL Thresholds in DM2024 and DM2039 – Part B

Noise Level	Daytime			Night-time		
	DM2024	DM2039	Difference	DM2024	DM2039	Difference
Equal to / greater than SOAEL	8	8	0	8	8	0
Between LOAEL and SOAEL	25	26	+1	33	35	+2

Noise Level	Daytime			Night-time		
	DM2024	DM2039	Difference	DM2024	DM2039	Difference
Below LOAEL	30	29	-1	22	20	-2

Table 1-22 – Number of Other Sensitive Receptors above the LOAEL and SOAEL Thresholds in DM2024 and DM2039 – Part B

Noise Level	Daytime			Night-time		
	DM2024	DM2039	Difference	DM2024	DM2039	Difference
Equal to / greater than SOAEL	2	2	0	2	3	+1
Between LOAEL and SOAEL	6	7	+1	9	8	-1
Below LOAEL	4	3	-1	0	0	0

NOTE: The following other sensitive receptors were not considered noise-sensitive during the night-time and are therefore not reported for this period: Tennis Court.

- 1.10.25. Without the Scheme, during the day, it can be seen that the future year shows there is one fewer dwelling (and one OSR) below the LOAEL and one more dwelling (and one OSR) between the LOAEL and SOAEL. During the night there is two fewer dwellings below the LOAEL, two more dwellings (and one fewer OSR) between the LOAEL and SOAEL, and one additional OSR above the SOAEL.
- 1.10.26. In line with the guidance in DMRB LA 111 (Ref. 1.1), consideration has been given to the change in noise levels that would arise at identified receptors, in the long-term, without the Scheme (i.e. DM2024 and DM2039).
- 1.10.27. **Figure 3: Do Minimum Noise Level Change – Part B** within **Appendix D: Noise Addendum Figures - Part 1** presents a noise level change contour map for this comparison showing the areas where noise level increases and decreases are predicted to arise in the absence of the Scheme.
- 1.10.28. **Table 1-23** presents the numbers of receptors within the Part B Detailed Calculation Area subject to different noise level changes for the long-term scenario without the Scheme. In accordance with DMRB LA 111, the assessment has been based on the façade point that is subject to the greatest magnitude of change in noise.

Table 1-23 – Noise-Sensitive Receptors, Long-term Noise Changes without the Scheme

Change in Noise Level		Magnitude of Impact	Daytime		Night-time	
			Number of Dwellings	Number of other Noise-Sensitive Receptors	Number of Dwellings	Number of other Noise-Sensitive Receptors
Increase in noise level L _{A10,18h} / L _{night}	0.1 – 2.9	Negligible	63	12	63	11
	3 – 4.9	Minor	0	0	0	0
	5 – 9.9	Moderate	0	0	0	0
	>=10	Major	0	0	0	0
No change	= 0	No change	0	0	0	0
Decrease in noise level L _{A10,18h} / L _{night}	0.1 – 2.9	Negligible	0	0	0	0
	3 – 4.9	Minor	0	0	0	0
	5 – 9.9	Moderate	0	0	0	0
	>=10	Major	0	0	0	0

NOTE: The following other sensitive receptors were not considered noise-sensitive during the night-time and are therefore not reported for this period: Tennis Court.

1.10.29. **Table 1-23** shows that all properties are predicted to experience a negligible increase in noise levels in the future year as a result of natural traffic growth.

1.11 POTENTIAL IMPACTS

OPERATIONAL ROAD TRAFFIC NOISE

1.11.1. Noise levels and noise changes have been assessed for both the short-term and the long-term. For the short-term, a comparison has been made between noise levels with the Scheme in the opening year (2024) and noise levels without the Scheme in the opening year (2024). This comparison considers only the change in noise levels due to the Scheme. For the long-term, a comparison has been made between the noise levels with the Scheme in the design year (DS2039) and the noise levels without the Scheme in the opening year (DM2024). This comparison includes the change in noise level as a result of the Scheme as well as general traffic growth.

1.11.2. The presentation of operational noise impacts has been split into the Part A and Part B detailed calculation areas.

Part A Detailed Calculation Area

- 1.11.3. Detailed pre-mitigation noise predictions have been carried out for 596 residential receptors and 16 non-residential noise sensitive receptors within the Part A detailed calculation area (see **Table 1-14**). This is in addition to three receptors that extend over a wide area, which are a Burial Ground (Northumberland Woodland Burials), River Coquet and Coquet Valley Woodlands SSSI and St Oswald's Way PRoW.
- 1.11.4. Figure 4: Short-term Noise Level Change – Part A within Appendix D: Noise Addendum Figures - Part 1 and Figure 5: Long-term Noise Level Change – Part A within Appendix D: Noise Addendum Figures - Part 1 present noise level change contour maps for the short-term and long-term respectively.
- 1.11.5. **Table 1-24** and **Table 1-25** show the comparison between the number of dwellings above and below the operational LOAEL and SOAEL in the short-term and the long-term respectively. This comparison has been based on the highest noise level predicted on any façade being representative of a particular sensitive receptor. This is considered appropriate as it represents a worst-case scenario for potential health effects.

Table 1-24 – Part A Detailed Calculation Area – Short-term Effect Levels – Dwellings

Noise Level	Daytime			Night-time		
	DM2024	DS2024	Difference	DM2024	DS2024	Difference
Equal to / greater than SOAEL	54	52	-2	55	55	0
Between LOAEL and SOAEL	334	393	+59	502	520	+18
Below LOAEL	208	151	-57	39	21	-18

Table 1-25 – Part A Detailed Calculation Area – Long-term Effect Levels – Dwellings

Noise Level	Daytime			Night-time		
	DM2024	DS2039	Difference	DM2024	DS2039	Difference
Equal to / greater than SOAEL	54	60	+6	55	61	+6

Noise Level	Daytime			Night-time		
	DM2024	DS2039	Difference	DM2024	DS2039	Difference
Between LOAEL and SOAEL	334	427	+93	502	522	+20
Below LOAEL	208	109	-99	39	13	-26

1.11.6. Overall, for dwellings, there is not much change in the number of receptors above SOAEL in the short-term, although there is an increase of six properties above the SOAEL in the long-term as a result of the Scheme. There is an increase in the number of properties above the LOAEL which suggests an increase in noise levels at receptors experiencing lower absolute noise levels.

1.11.7. **Table 1-26** and **Table 1-27** show the same comparisons for the Other Sensitive Receptors within the Part A detailed calculation area.

Table 1-26 – Part A Detailed Calculation Area – Short-term Effect Levels – Other Sensitive Receptors

Noise Level	Daytime			Night-time		
	DM2024	DS2024	Difference	DM2024	DS2024	Difference
Equal to / greater than SOAEL	2	1	-1	2	0	-2
Between LOAEL and SOAEL	10	11	+1	9	11	+2
Below LOAEL	4	4	0	0	0	0

NOTE: The following receptors were not considered sensitive during the night-time and are therefore not reported for this period: Felton Park Rifle Range, Eshott Heugh Paintballing Site, Tritlington C of E First School, Fairmoor Cemetery and the Tennis Court.

Table 1-27 – Part A Detailed Calculation Area – Long-term Effect Levels – Other Sensitive Receptors

Noise Level	Daytime			Night-time		
	DM2024	DS2039	Difference	DM2024	DS2039	Difference
Equal to / greater than SOAEL	2	1	-1	2	0	-2
Between LOAEL and SOAEL	10	13	+3	9	11	+2
Below LOAEL	4	2	-2	0	0	0

NOTE: The following receptors were not considered sensitive during the night-time and are therefore not reported for this period: Felton Park Rifle Range, Eshott Heugh Paintballing Site, Tritlington C of E First School, Fairmoor Cemetery and the Tennis Court.

- 1.11.8. Overall, in terms of the LOAEL and SOAEL threshold levels, within the Part A detailed calculation area, the Scheme is expected not to change the category into which most receptors (both residential and other-sensitive) fall. There are only small changes in the number of receptors predicted to exceed the SOAEL as a result of the Scheme in the short- and long-term. However, the Scheme is predicted to result in fewer receptors expected to experience noise levels below the LOAEL, suggesting overall a small adverse effect.
- 1.11.9. **Table 1-28** shows the predicted short-term change in noise level for all modelled receptors within the detailed calculation area, sorted into the noise change bands following the DMRB LA 111 (Ref. 1.1) magnitude of impact categories. Although negligible noise changes are referred to in the table and discussion, it should be noted that these changes would most likely be imperceptible to sensitive receptors.

Table 1-28 – Short-term Traffic Noise Changes – Part A

Change in Noise Level		Magnitude	Daytime		Night-time	
			Number of Dwellings	Number of other Sensitive Receptors	Number of Dwellings	Number of other Sensitive Receptors
Increase in noise level $L_{A10,18h} / L_{night}$	0.1 – 0.9	Negligible	454	7	463	6
	1 – 2.9	Minor	83	5	76	2
	3 – 4.9	Moderate	18	0	16	0
	≥ 5	Major	3	0	3	0
No change	= 0	No change	0	0	0	0
Decrease in noise level $L_{A10,18h} / L_{night}$	0.1 – 0.9	Negligible	2	0	1	0
	1 – 2.9	Minor	9	0	10	0
	3 – 4.9	Moderate	2	0	3	0
	≥ 5	Major	25	4	24	3

- 1.11.10. **Table 1-28** shows that whilst the impacts vary from major adverse to major beneficial, the majority of receptors are expected to experience a negligible change in noise level as a result of the Scheme.
- 1.11.11. **Table 1-29** shows the predicted long-term change in noise level for all modelled receptors within the detailed calculation area, sorted into the noise change bands following the DMRB LA 111 (Ref. 1.1) magnitude of impact categories.

Table 1-29 – Long-term Traffic Noise Changes – Part A

Change in Noise Level		Magnitude	Daytime		Night-time	
			Number of Dwellings	Number of other Sensitive Receptors	Number of Dwellings	Number of other Sensitive Receptors
Increase in noise level $L_{A10,18h} / L_{night}$	0.1 – 2.9	Negligible	524	11	533	8
	3 – 4.9	Minor	32	1	23	0
	5 – 9.9	Moderate	3	0	4	0
	≥ 10	Major	2	0	0	0
No change	= 0	No change	0	0	0	0
Decrease in noise level $L_{A10,18h} / L_{night}$	0.1 – 2.9	Negligible	9	0	9	0
	3 – 4.9	Minor	2	0	3	0
	5 – 9.9	Moderate	20	4	20	3
	≥ 10	Major	4	0	4	0

- 1.11.12. **Table 1-29** shows that whilst the impacts vary from major adverse to major beneficial, the majority of receptors are expected to experience a negligible change in noise level as a result of the Scheme.
- 1.11.13. Before undertaking an assessment of significance, it is worthwhile considering the noise levels and changes at receptors that lie within the two NIAs described in **Table 1-16**:
- NIA 10002 (two properties) Causey Park – The predicted noise levels exceed the daytime SOAEL at both receptors in the DM2024 scenario. Whilst both receptors are also predicted to exceed the daytime SOAEL in the DS2024 scenario, they are predicted to experience beneficial noise level changes of major magnitude as a result of the Scheme. This is because they are located along the section of de-trunked A1 with the new A1 carriageway located over 250 m from these receptors.
 - NIA 10003 (three properties) Northgate Farm – The predicted noise levels exceed the daytime SOAEL at all three receptors in both the DM2024 and DS2024 scenarios. Two receptors are predicted to experience noise level increases of minor magnitude in the short-term, whilst the other receptor is predicted to experience a negligible adverse increase.

- 1.11.14. An initial assessment of significance has been undertaken adopting the criteria presented within **Table 1-11** (from DMRB LA 111 Table 3.58) and considering the predicted short-term noise level changes.
- 1.11.15. DMRB LA 111 (Ref. 1.1) then describes a framework of contextual factors (reproduced above in **Table 1-12**, from DMRB LA 111 Table 3.60) which should be considered in the final determination of operational noise significant effects, although as a starting point, minor impacts are likely not to be significant, and moderate impacts are likely to be significant. It should also be noted that some of the contextual factors are numerical (i.e. the absolute noise level and noise level changes) and some are non-numerical (i.e. receptor setting, acoustic context and perception) and as such there is inevitably an element of professional judgement and balance to be applied when determining final significance. The aim has been to make such judgements in a consistent manner along the entire Scheme, which in certain situations has led to receptors being collated into groups likely to experience significant and non-significant effects, even though the predicted noise levels and changes at receptors close to the shared boundary between these groups may be expected to be similar.
- 1.11.16. **Table 1-30** along with Figure 6: Determination of Significance - Receptor Groups – Part A within Appendix D: Noise Addendum Figures - Part 2 set out groups of receptors based on their daytime⁷ short-term magnitude of impact (as required by DMRB LA 111) along with other contextual factors to determine whether a significant effect is anticipated and therefore if mitigation requires consideration.
- 1.11.17. For receptors experiencing a short-term noise level change of moderate magnitude, which initially would be considered a significant effect, the full range of contextual factors (numerical and non-numerical) set out within Table 3-60 of DMRB LA 111 have been considered when determining whether the initial assessment of significance is retained or adjusted. The factors considered include the following:
- Where within the range of the magnitude of impact category, the noise level changes fall.
 - The magnitude of impact in the long-term.
 - The absolute noise level with reference to the LOAEL and SOAEL.
 - The location of the receptor, in particular the setting and location of sensitive parts of the receptor.
 - The acoustic context (whether the acoustic character of the area is likely to be changed by the Scheme).
 - The likely perception of change by the residents (whether the Scheme results in noise level changes being more acutely perceived by receptors).

⁷ The daytime noise level changes have been used as these generally result in a more cautious assessment (i.e. more receptors with higher adverse changes) than would be the case if the night-time noise level changes were used

- 1.11.18. For receptors experiencing a short-term noise level change of minor magnitude, which initially would be considered a non-significant effect, a similar exercise to that above has been undertaken. Particular consideration has been given to the DMRB LA 111 guidance in Table 3.60 which makes reference to the following as having the potential to alter the initial assessment of significance. Both of these could be taken, along with other relevant factors, as a reason for determining a significant effect where changes are of minor magnitude:
- Noise level changes towards the upper end of the minor range.
 - An absolute do-something noise level above the SOAEL and a change of minor magnitude.

Table 1-30 – Specific Noise-Sensitive Receptor Summary and Determination of Significance – Operational Road Traffic Noise – Part A

Receptor Group (refer to Figure 6: Determination of Significance - Receptor Groups – Part A)	Number of Dwellings (Other Sensitive Receptors)	Short-Term Magnitude of Impact (and contextual factors)	Justification of Significance	Significance
Group 1 	24 (4 – Tritlington C of E First School, The Oak Inn, Oakwood Holiday Cottages)	Major and Moderate (Decrease)	The Scheme would improve the noise climate at these properties. As the magnitude of impact is predicted to be moderate or major, the noise level changes are deemed significant.	Significant (Beneficial)
Group 2 	3	Major and Moderate (Decrease)	Whilst the greatest magnitude of impact at these properties is major or moderate decrease, adverse changes on other façades mean that these properties are not considered significant beneficial effects.	Not Significant
Group 3 	11	Minor and Negligible (Decrease)	The Scheme would improve the noise climate at these properties. However, as the magnitude of impact is predicted to be minor or negligible, the noise level changes are deemed not significant.	Not Significant
Group 4 	454 (7 – Fairmoor Cemetery, Northgate Hospital two buildings, Morpeth Equine Centre, The Fairmoor Centre, Fairmoor veterinary Centre, Fivehills Cattery)	Negligible (Increase)	The increases in noise levels as a result of the Scheme are considered unlikely to be perceptible. Consequently, the noise level changes are deemed not significant.	Not Significant
Group 5 	73 (5 – Felton Park Rifle Range, Tennis Court, Cowslip Cottage, Northumberland Canine Centre, Eshott Heugh Paintballing Site)	Minor (Increase) (Noise levels are below the SOAEL)	Although the Scheme is predicted to result in minor noise level increases at these receptors, the absolute noise levels remain below the SOAEL. DMRB LA 111 advises that short-term minor adverse impacts are likely to not be significant.	Not Significant
Group 6 	9	Minor (Increase) (Noise levels are above the SOAEL)	Whilst these properties are predicted to experience minor adverse impacts and noise levels above the SOAEL, the noise level change is within the lower end of the minor magnitude of impact category on a façade predicted to exceed the SOAEL. Therefore, the impacts at these receptors are deemed not significant.	Not Significant
Group 7 	1 – Northgate Farm	Minor (Increase) (Noise level is above the SOAEL)	This receptor is very close to the road and predicted to experience noise level changes within the upper end of the minor magnitude of impact category on façades which are also predicted to exceed the SOAEL. The noise level change is, therefore, deemed significant.	Significant (Adverse)
Group 8	12	Moderate (Increase)	These receptors all receive a moderate adverse impact in the short-term (some within the mid to upper end of the moderate category). However, the absolute levels are low (below the LOAEL for some receptors) and the long-term increases	Not Significant

Receptor Group (refer to Figure 6: Determination of Significance - Receptor Groups – Part A)	Number of Dwellings (Other Sensitive Receptors)	Short-Term Magnitude of Impact (and contextual factors)	Justification of Significance	Significance
			are less than moderate. In terms of non-numerical factors, the situation at these properties is such that the acoustic character of an area is unlikely to change (e.g. the dominant noise source affecting a particular receptor is the A1 before or after the opening of the Scheme) or that the juxtaposition of the source and receiver means that residents are unlikely to perceive the noise level changes any more acutely (e.g. the view of the road is such that it is unlikely to enhance the residents' perception of the road traffic noise levels and changes). Therefore, the impacts at these receptors are deemed not significant.	
Group 9 	6 – Fenrother Grange, The Old Barn, Stonebrook Cottage, East Fenrother Farm, and The Cottage and 3 The Cottage (East Fenrother Farm Cottages)	Moderate (Increase)	Whilst the impacts at these receptors in Fenrother could be viewed as broadly similar to other nearby receptors (many of which fall into Group 8), there are some notable differences. Numerically these receptors have a noise level within the mid to upper end of the moderate category and a noise level above the LOAEL at night, but importantly they are located on the eastern edge of Fenrother with views towards the Scheme and given the realignment of the A1 closer to these properties it is considered likely that the acoustic character affecting the receptors could change and that the residents perception of the road traffic noise levels and changes might be enhanced. Therefore, the impacts at these receptors are deemed significant.	Significant (Adverse)
Group 10 	2 – The Cottage and Joiners Cottage, Causey Park	Major (Increase)	These properties are predicted to experience a greatest magnitude of noise level change of major adverse magnitude as a direct result of the Scheme and this noise level change is, therefore, deemed significant. Whilst they are predicted to experience a noise level change of major adverse magnitude on one façade, at least one other façade would also experience a beneficial reduction in noise level.	Significant (Adverse)
Group 11 	1 – New Houses Farm	Major (Increase)	This property (New Houses Farm) is predicted to experience a noise increase of major magnitude on multiple façades as a direct result of the Scheme (the A1 is moving around 500 m closer to this property) and this noise level change is, therefore, deemed significant.	Significant (Adverse)

Designated Sites and Burial Ground

1.11.19. Whilst the two designated sites (River Coquet and Coquet Valley Woodlands SSSI and St Oswald's Way PRow) and the Burial Ground (Northumberland Woodland Burials) are considered as 'other sensitive' receptors, it is not appropriate to include them in the above tables as they cover a large area where it would be inappropriate to select a single point as representative of the area as a whole. From analysis of the predicted noise change (**Figure 4: Short-term Noise Level Change – Part A** within **Appendix D: Noise Addendum Figures - Part 1** and **Figure 5: Long-term Noise Level Change – Part A** within **Appendix D: Noise Addendum Figures - Part 1**), the following conclusions have been identified for the three areas:

- River Coquet and Coquet Valley Woodlands SSSI – The noise level changes in the short-term are predominantly of moderate and major adverse magnitude. In the long-term the noise level changes are predominantly of minor and moderate adverse magnitude. Short-term changes of moderate and major magnitude should be considered with regard to potential significance. However, the Scheme related noise levels and changes are considered not significant for any human receptors within this designated site. This is because human activity within the designated site will ordinarily be transient and occasional and therefore exposure to operational road traffic noise from the Scheme would be limited. This means that people within this designated site would not be in a position to experience a change in noise level as they would were they a permanent receptor. In this circumstance the absolute noise levels experienced would be more relevant than the noise level changes. The daytime road traffic LOAEL (55 dB LA10,18hr façade) is based on World Health Organisation (WHO) guidance for environmental noise levels (Ref. 1.24) and such levels would be experienced in a limited part of the SSSI approximately 300 m either side of the A1. Whilst noise levels above the LOAEL can indicate an adverse impact, the proportion of the SSSI expected to exceed the LOAEL is small. Furthermore, some of this area is already expected to exceed the LOAEL as a result of road traffic noise from the existing A1. Therefore, in summary the noise effects arising from the Scheme are deemed not significant for human receptors within the River Coquet and Coquet Valley Woodlands SSSI.
- St Oswald's Way – This PRow covers a similar area to the River Coquet and Coquet Valley Woodlands SSSI and the potential impacts are very similar to those described above. As above, the PRow is predicted to experience major and moderate noise level changes in the short-term and minor and moderate noise level changes in the long-term. However, the change in noise level caused by the Scheme is deemed not significant for St Oswald's Way for the same reasons outlined above in relation to the SSSI.
- Burial Ground (Northumberland Woodland Burials) – The site bounds the A1 immediately to the east. In the short-term, the noise levels as a result of the Scheme are predicted to cause predominantly minor adverse impacts for the majority of the site with a small area of moderate adverse impact close to the carriageway. In the long-term the noise level changes are predicted to be of minor adverse or negligible impact. Given the short-term

changes are predominantly of minor magnitude, the change in noise level caused by the Scheme is deemed not significant for the Burial Ground.

Felmoor Park and Bockenfield Holiday Park

- 1.11.20. In light of the ambiguity regarding the number of receptors in this area, the noise changes are presented in the form of noise contours in **Figure 7: Short-term Noise Level Change for Felmoor Park and Bockenfield Holiday Park** within **Appendix D: Noise Addendum Figures - Part 2**, rather than at specific receptor locations.
- 1.11.21. In the north of the holiday parks, the Scheme is predicted to cause noise level increases of minor magnitude of impact at some receptors. Towards the centre and south of the parks the majority of receptors are likely to experience a noise level change of no greater than negligible magnitude. Consequently, the noise level changes in Felmoor Park and Bockenfield Holiday Park are considered not significant. The majority of the sensitive receptors are likely to be above the LOAEL and therefore enhancement measures have been considered. This is discussed in greater detail from **paragraph 1.12.19** onwards

Part B Detailed Calculation Area

- 1.11.22. Detailed pre-mitigation noise predictions have been carried out for 63 residential receptors and 12 non-residential noise-sensitive receptors within the Part B detailed calculation area (see **Table 1-15**).
- 1.11.23. Figure 8: Short-term Noise Level Change – Part B within Appendix D: Noise Addendum Figures - Part 2 and Figure 9: Long-term Noise Level Change – Part B within Appendix D: Noise Addendum Figures - Part 2 present noise level change contour maps for the short-term and long-term comparison respectively.
- 1.11.24. **Table 1-31** and **Table 1-32** show the comparison between the number of dwellings above and below the operational LOAEL and SOAEL in the short-term and long-term respectively. This comparison has been based on the highest noise level predicted on any façade being representative of a particular sensitive receptor. This is considered appropriate as it represents a worst case-scenario for potential health effects.

Table 1-31 – Part B Detailed Calculation Area – Short-term Effect Levels – Dwellings

Noise Level	Daytime			Night-time		
	DM2024	DS2024	Difference	DM2024	DS2024	Difference
Equal to / greater than SOAEL	8	4	-4	8	4	-4
Between LOAEL and SOAEL	25	29	+4	33	38	+5
Below LOAEL	30	30	0	22	21	-1

Table 1-32 – Part B Detailed Calculation Area – Long-term Effect Levels – Dwellings

Noise Level	Daytime			Night-time		
	DM2024	DS2039	Difference	DM2024	DS2039	Difference
Equal to / greater than SOAEL	8	6	-2	8	8	0
Between LOAEL and SOAEL	25	28	+3	33	35	+2
Below LOAEL	30	29	-1	22	20	-2

1.11.25. The results presented within **Table 1-31** and **Table 1-32** indicate a slight overall beneficial effect as a result of the Scheme within the Part B detailed calculation area. This is due to a reduction in traffic flow on the B6341 to the west of the Scheme, (with the Scheme moving the A1 to the east and away from the existing A1 alignment within the vicinity of West Link Hall Cottages) and the application of low noise surfacing for the Do-something opening and future years.

1.11.26. **Table 1-31** and **Table 1-32** show the same comparisons for the Other Sensitive Receptors within the Part B detailed calculation area.

Table 1-33 – Part B Detailed Calculation Area – Short-term Effect Levels – Other Sensitive Receptors

Noise Level	Daytime			Night-time		
	DM2024	DS2024	Difference	DM2024	DS2024	Difference
Above SOAEL	2	1	-1	2	1	-1
Between LOAEL and SOAEL	6	8	+2	9	10	+1
Below LOAEL	4	3	-1	0	0	0

Table 1-34 – Part B Detailed Calculation Area – Long-term Effect Levels – Other Sensitive Receptors

Noise Level	Daytime			Night-time		
	DM2024	DS2039	Difference	DM2024	DS2039	Difference
Above SOAEL	2	1	-1	2	1	-1

Noise Level	Daytime			Night-time		
	DM2024	DS2039	Difference	DM2024	DS2039	Difference
Between LOAEL and SOAEL	6	8	+2	9	10	+1
Below LOAEL	4	3	-1	0	0	0

- 1.11.27. Overall, in terms of the LOAEL and SOAEL threshold levels, within the Part B detailed calculation area, the Scheme is expected not to change the category into which most receptors fall. The Scheme is predicted to result in a reduction of a small number of receptors categorised as being above the SOAEL and an increase in the number of receptors categorised as being between the LOAEL and SOAEL, thus suggesting a small beneficial effect. There is however also predicted to be a slight reduction in the number of receptors categorised as being below the LOAEL.
- 1.11.28. **Table 1-35** shows the predicted short-term change in noise level for all modelled receptors within the Part B detailed calculation area, sorted into the noise change bands following the DMRB LA 111 (Ref. 1.1) magnitude of impact categories. Although negligible noise changes are referred to in the table and discussion, it should be noted that these changes would most likely be imperceptible at sensitive receptors.

Table 1-35 – Short-term Traffic Noise Changes – Part B

Change in Noise Level	Magnitude of Impact	Daytime		Night-time		
		Number of Dwellings	Number of Other Sensitive Receptors	Number of Dwellings	Number of Other Sensitive Receptors	
Increase in noise level L _{A10,18h} / L _{night}	0.1 – 0.9	Negligible	21	4	24	5
	1 – 2.9	Minor	4	1	1	0
	3 – 4.9	Moderate	0	0	0	0
	>=5	Major	0	0	0	0
No change	= 0	No change	0	0	0	0
Decrease in noise level L _{A10,18h} / L _{night}	0.1 – 0.9	Negligible	26	3	26	2
	1 – 2.9	Minor	9	3	9	3
	3 – 4.9	Moderate	2	0	2	1
	>=5	Major	1	1	1	0

- 1.11.29. From **Table 1-35** it is evident that predicted noise level increases in the short-term range from negligible to minor. The majority of predicted noise level decreases range between negligible and minor magnitude, with a small number of receptors predicted to experience decreases of moderate and major magnitude.
- 1.11.30. **Table 1-36** shows the predicted long-term change in noise level for all modelled receptors within the detailed calculation area, sorted into the noise change bands following the DMRB LA 111 magnitude of impact categories.

Table 1-36 – Long-term Traffic Noise Changes – Part B

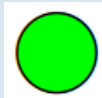
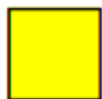
Change in Noise Level		Magnitude of Impact	Daytime		Night-time	
			Number of Dwellings	Number of Other Sensitive Receptors	Number of Dwellings	Number of Other Sensitive Receptors
Increase in noise level LA10,18h / L _{night}	0.1 – 2.9	Negligible	47	7	47	6
	3 – 4.9	Minor	0	0	0	0
	5 – 9.9	Moderate	0	0	0	0
	>=10	Major	0	0	0	0
No change	= 0	No change	0	0	0	0
Decrease in noise level LA10,18h / L _{night}	0.1 – 2.9	Negligible	14	4	14	4
	3 – 4.9	Minor	1	1	2	1
	5 – 9.9	Moderate	1	0	0	0
	>=10	Major	0	0	0	0

- 1.11.31. From **Table 1-36** it is evident that the majority of receptors, in the long-term, are predicted to experience noise level increases of negligible magnitude as a result of the Scheme. Predicted noise level increases in the long-term are of no greater than negligible magnitude. The majority of predicted noise level decreases are negligible with a small number of decreases of minor and moderate magnitude.
- 1.11.32. For determining significant effects within Part B of the Scheme, the same approach has been adopted as used for Part A, as described within **paragraphs 1.11.14 to 1.11.18**. In summary, the initial assessment of significance indicates that short-term noise level changes of negligible and minor impact would be unlikely to be significant and moderate

and major impact would be likely to be significant, although a framework of contextual factors should be considered in the final determination of operational noise significant effects.

- 1.11.33. Adopting this approach, significant adverse effects are not expected, because only negligible and minor changes are predicted. However, given that some of the predicted noise level increases are of minor magnitude, other contextual factors should be considered to determine final significance as discussed within **paragraphs 1.11.15 to 1.11.18**.
- 1.11.34. For predicted short-term noise level decreases, given that decreases of minor, moderate and major magnitude are predicted, these should be considered further to determine final significance.
- 1.11.35. **Table 1-37** along with Figure 10: Determination of Significance - Receptor Groups – Part B within Appendix D: Noise Addendum Figures - Part 2 set out groups of receptors based on their daytime short-term magnitude of impact along with other contextual factors to determine whether a significant effect is anticipated and therefore if mitigation requires consideration.

Table 1-37 – Specific Noise-Sensitive Receptor Summary and Determination of Significance – Operational Road Traffic Noise – Part B

Receptor Group (refer to Figure 10: Determination of Significance – Receptor Groups – Part B)	Number of Dwellings (Other Sensitive Receptors)	Short-Term Magnitude of Impact (and contextual factors)	Justification of Significance	Significance
Group 1 	3 - Patterson Cottage, 1 and 4 West Link Hall Cottages (1 - Patterson Cottage Boarding Kennels)	Major and Moderate (Decrease)	The Scheme would improve the noise climate at these properties. As the magnitudes of impact are predicted to be moderate or major, the noise level changes are deemed significant.	Significant (Beneficial)
Group 2 	35 (5 – Heckley Cottage, Rock Moor House, The Chalet, Rock Moor House, West Lodge)	Minor and Negligible (Decrease)	The Scheme would improve the noise climate at these properties. As the magnitude of impact is predicted to be minor or negligible, the noise level changes are deemed not significant.	Not Significant
Group 3 	21 (4 – 4 The Cottages, The Old Reading Rooms, Watermill Cottage, The Armstrong Household and Farming Museum)	No change/ Negligible (Increase)	The Scheme either does not alter the noise level at these receptors or the increases are considered unlikely to be perceptible. Consequently, the noise level changes are deemed not significant.	Not Significant
Group 4 	3 (1 – 10 The Cottages)	Minor (Increase) (Noise levels are below the SOAEL)	Although the Scheme is predicted to result in noise level increases at these receptors, the absolute noise levels remain below the SOAEL. DMRB LA111 advises that short-term minor adverse impacts are likely to not be significant.	Not Significant
Group 5 	1	Minor (Increase) (Noise levels are above the SOAEL)	Whilst this property is predicted to experience minor adverse impacts and noise levels are above SOAEL, the noise level change is within the lower end of the minor magnitude of impact category. Therefore, the impact at this receptor is deemed not significant.	Not Significant

Wider Network Noise Level Changes

- 1.11.36. In addition to the Part A and Part B detailed calculation areas, the Scheme Study Area includes a number of 50 m buffers around links which are outside of these areas and which are predicted to experience a short-term BNL change (increase or decrease) of more than 1 dB as a result of the Scheme.
- 1.11.37. For all but six links, changes of no greater than minor magnitude of impact are predicted, and these are considered to be not significant.
- 1.11.38. There are four links which are subject to operational road traffic noise level changes of **moderate beneficial** magnitude of impact. These are identified within **Figure 11: Wider Network Noise Changes** within **Appendix D: Noise Addendum Figures - Part 2**.
- 1.11.39. Operational road traffic noise level changes of **Moderate adverse** magnitude of impact are predicted for two road links in the short-term and one in the long-term (which also has a moderate adverse magnitude of impact in the short-term). These links are located to the north-west of Part A of the Scheme, approximately 12 km from the north end of the Part A detailed calculation area.
- 1.11.40. Both links are predicted to experience noise level changes at the lower end of the moderate noise level change band, 3.5 and 3.2 dB in the short-term and 5.1 dB for the one road link predicted to experience a long-term moderate noise level change (corresponding to the 3.5 dB short-term change).
- 1.11.41. Both of these are rural roads, predicted to carry very low numbers of vehicles (less than 1,600 in the Do-minimum opening year). Using the CRTN (Ref. 1.21) BNL methodology a low flow correction is added to links with a predicted 18-hour flow of less than 4,000 vehicles. Where this low flow correction is applied, a small change in vehicle numbers can lead to a large change in noise level which is not necessarily representative of the perception of people living close to the road. Without this low flow correction, predicted road traffic noise level changes fall within the minor noise level change band.
- 1.11.42. More detail regarding the noise level changes and locations of the predicted moderate adverse impacts is presented in **Appendix C: Wider Network Noise Level Changes**, and **Figure 11: Wider Network Noise Level Changes** within **Appendix D: Noise Addendum Figures - Part 2**, which shows the location of those links predicted to experience a moderate adverse increase in noise level.
- 1.11.43. Given the low traffic flow on these links, and the large distance from the Scheme, the predicted noise level changes are deemed to be not significant.

Noise Insulation Regulations

- 1.11.44. In order to qualify for compensation under the NIR (**Ref.1.5**), four criteria must be fulfilled as presented from paragraph 1.7.27 onwards.

Part A Detailed Calculation Area

- 1.11.45. Within the Part A detailed calculation area, the following five dwellings are predicted to meet all four criteria for eligibility under the NIR (Ref. 1.7):
- Northgate Farm
 - 1 Warreners Cottages
 - 2 Warreners Cottages
 - Capri Lodge
 - Strafford House
- 1.11.46. A noise barrier is proposed which would reduce noise levels in the area of Northgate Farm. Should this barrier be built, only Capri Lodge and Strafford House are predicted to be eligible for noise insulation under the NIR.
- 1.11.47. As only a preliminary assessment can be undertaken at this stage eligibility would be reviewed at the detailed design stage.

Part B Detailed Calculation Area

- 1.11.48. Within the Part B detailed calculation area, there are no dwellings which are predicted to meet all four criteria.
- 1.11.49. As only a preliminary assessment can be undertaken at this stage eligibility would be reviewed at the detailed design stage.

FUTURE DEVELOPMENTS

- 1.11.50. It is appropriate to consider the significance of effects on future developments within the operational road traffic noise study area. From the list of committed developments within **Appendix 16.1 Cumulative Short List (APP-327)**, five developments have been granted planning permission, which are at least partly within the Part A detailed calculation area. The potential impacts from the Scheme upon these developments are described in Table 1-38.

Table 1-38 – Impacts from the Scheme on Future Developments

Development ID¹	Brief Description	Potential Impact from Part A	Potential Significant Effect?
2	Change of use of land within part of airfield for outdoor recreational activities including corporate team building and experience days, and off-road motor vehicle driving experiences together with construction of associated activity centre off-road motor vehicle course, screen mounding, car parking area, internal site access track and landscape planting.	Given the stated use of the proposed site for development, this site does not qualify as a noise-sensitive receptor and is therefore considered no further in this assessment.	N/A
7	Reserved Matters Application seeking consent for; appearance, landscape planting, layout and scale for 218 dwellings following outline approval of application ref 13/02105/OUT- (Outline Planning Application for the proposed development of approximately 255 residential dwellings with associated access).	Only the northern part of this site lies within the operational noise detailed calculation area. Within the detailed calculation area, Figure 4: Short-term Noise Level Change – Part A within Appendix D: Noise Addendum Figures - Part 1 , shows that in the short-term, the Scheme is predicted to cause a change in noise levels of negligible magnitude.	Not Significant
14	Proposed siting of 24 timber holiday lodges, 10 static caravans including associated site access roads and construction of miniature golf course.	Figure 4: Short-term Noise Level Change – Part A within Appendix D: Noise Addendum Figures - Part 1 , shows that in the short-term, the Scheme is predicted to cause a change in noise level of no greater than minor adverse magnitude in the area covered by this application.	Not Significant
20	Hybrid Application incorporating: Detailed application for demolition of hospital buildings (excl. medical directorate, Tweed, Tyne, Hebron, Hepscott, Mitford unit, Gees Club, Chapel (PMVA), Bothal, Cambo and Belsay Villas), Development of medium secure in-patient unit and ancillary facilities; Refurbishment of Gees Club (Villa 34), Hebron, Medical directorate and Belsay, Bothal and Cambo Villas and Hepscott 1-4; Associated parking and landscape works across masterplan area; and, Outline application for residential development.	Figure 4: Short-term Noise Level Change – Part A within Appendix D: Noise Addendum Figures - Part 1 , shows that in the short-term, the Scheme is predicted to cause a change in noise level of negligible magnitude in the area covered by this application.	Not Significant
21	Construction of 61 no. dwellings with associated landscaping, access and infrastructure works.	Figure 4: Short-term Noise Level Change – Part A within Appendix D: Noise Addendum Figures - Part 1 , shows that in the short-term, the Scheme is predicted to cause a change in noise level of negligible magnitude in the area covered by this application	Not Significant

NOTE [1] – For further details of the developments refer to **Appendix 16.1: Cumulative Short List (APP-327)**

1.12 DESIGN, MITIGATION AND ENHANCEMENT MEASURES

1.12.1. Whilst the operational noise level predictions presented in this Noise Addendum have been updated from those presented in **Chapter 6 Noise and Vibration Part A (APP-042)** and **Chapter 6 Noise and Vibration Part B (APP-043)** the specific measures included for design, mitigation and enhancement have not been needed to be updated for the Scheme. However, given the updated noise level predictions, the justification for inclusion of these measures has necessarily been updated and is presented in this section.

DESIGN

1.12.2. Where possible the offline alignment avoids passing unnecessarily close to sensitive receptors. The vertical alignment was lowered as far as practicable given other design constraints (this generally ensures lower noise levels as receptors would have greater screening from the road).

1.12.3. The road surface for the entire Scheme would be laid with LNS, the quietest road surface type, apart from on structures, where HRA would be laid. This is included in row A-N1 of Table 3-2 within the Outline Construction Environmental Management Plan (**Document Reference: 7.3**).

MITIGATION

Mitigation for Significant Noise Effects

Part A Detailed Calculation Area

1.12.4. **Table 1-30** identifies that the Scheme within the Part A detailed calculation area gives rise to significant adverse noise effects at ten receptors (within Groups 7, 9, 10 and 11). As such, mitigation must be considered for these properties.

1.12.5. Significant adverse effects in the context of the EIA Regulations (**Ref. 1.5**) need to be mitigated where possible.

1.12.6. Notwithstanding the above, it is not appropriate to include noise barriers regardless of the benefits they provide. As such, noise barriers have only been considered for mitigation for significant adverse effects where they provide a meaningful benefit of at least 3 dB.

1.12.7. The predicted noise level change at the following three groups is deemed to be significant, and mitigation has been proposed as follows:

- Group 10 – A reflective noise barrier (PNB2) is proposed at a height of 4 m, the location of this barrier is shown on **Figure 1: Operational Road Traffic Noise Study Area** within **Appendix D: Noise Addendum Figures - Part 1**.
- Group 11 – An absorptive noise barrier (PNB3) is proposed at a height of 4 m, the location of this barrier is shown on **Figure 1: Operational Road Traffic Noise Study Area** within **Appendix D: Noise Addendum Figures - Part 1**.
- Group 7 – A reflective noise barrier (PNB1) is proposed at a height of 3 m, the location of this barrier is shown on **Figure 1: Operational Road Traffic Noise Study Area** within

Appendix D: Noise Addendum Figures - Part 1. Given the proximity of Northgate Farm to the Scheme, only a very short section of noise barrier would be required to mitigate the significant adverse effect in this location. However, a greater length of noise barrier has been included to provide benefits to additional properties. This is discussed further below in paragraph 1.12.25. It is understood that in this location, further investigation is required to determine whether there is space for the required foundations for this barrier.

- 1.12.8. Mitigation measures in the form of earth bunds and noise barriers have been considered for the significant adverse effects in Fenrother (Group 9), however, given the distance from the Scheme carriageway to the receptors, a barrier or bund would not provide a meaningful benefit at these receptors.
- 1.12.9. Both PNB2 and PNB3 are proposed at a height of 4 m. 3 m high barriers were tested in these locations but were predicted not to achieve the 3 dB threshold for a meaningful benefit at the residential properties. Therefore, the proposed barriers have been included at a height of 4 m.
- 1.12.10. At Joiners Cottage (Group 10) PNB2 gives a maximum noise reduction of 2.9 dB at a barrier height of 3 m and a maximum noise reduction of 3.8 dB at a barrier height of 4 m.
- 1.12.11. At The Cottage (Group 10) PNB2 gives a maximum noise reduction of 2.8 dB at a barrier height of 3 m and a maximum noise reduction of 3.7 dB at a barrier height of 4 m.
- 1.12.12. At New Houses Farm (Group 11) PNB3 gives a maximum noise reduction of 2.7 dB at a barrier height of 3 m and a maximum noise reduction of 4.1 dB at a barrier height of 4 m.
- 1.12.13. PNB1 is proposed at a height of 3m, as this barrier height was predicted to achieve the 3 dB threshold for a meaningful benefit at residential properties.
- 1.12.14. Noise barriers PNB2, PNB3 and PNB1 are included in rows A-N2, A-N3 and A-N4 of Table 3-2 within the Outline Construction Environmental Management Plan (**Document Reference: 7.3**).

Mitigation for Other Environment Topics

- 1.12.15. Environmental bunds have been proposed to mitigate landscape and visual effects. These nine bunds (further details of which are provided in Section 2.6 of **Chapter 2: The Scheme (APP-037)**) would also serve as mitigation for noise. As such, these nine bunds have been modelled with the proposed noise mitigation presented above. Refer to **Figure 7.8: Landscape Mitigation Masterplan Part A (APP-095)** for their locations.
- 1.12.16. The benefits from the above mitigation (both the noise barriers and environmental mitigation bunds) are considered in Section 1.13.

Part B Detailed Calculation Area

- 1.12.17. **Table 1-37** identifies that the Scheme within the Part B detailed calculation area does not give rise to significant adverse noise effects at any of the identified noise-sensitive

receptors. As such, mitigation is not required in relation to operational noise effects associated with Part B of the Scheme.

Wider Area

- 1.12.18. Significant adverse noise effects have not been identified for the wider area road network beyond the Part A and B detailed calculation areas. Mitigation applicable to the existing, unaltered wider road network has therefore not been considered.

ENHANCEMENT MEASURES

Operational Noise

- 1.12.19. As discussed in Section 0, for the Scheme to be compliant with the NPSE (**Ref. 1.8**), noise levels above SOAEL should be avoided, whilst noise levels between LOAEL and SOAEL should be mitigated and reduced to a minimum, provided that mitigation / enhancement measures are considered sustainable (refer to paragraph 1.12.20).
- 1.12.20. It is stated that the above aims should be achieved within the context of Government policy on sustainable development, although this concept is not clearly defined. For this assessment, enhancement has been considered sustainable based on the following three tests (based on professional judgement and the NPSE):
- Noise enhancement in the form of acoustic screening has only been considered within the Order Limits, where noise levels are dominated by the A1 and where the enhancement measure would not restrict access to property. In addition, for noise enhancement to be included, it should ideally provide a meaningful benefit. In this case a meaningful benefit has been taken as a reduction in noise levels of at least 3 dB as this is generally considered a level which could be perceived by residents.
 - Noise bunds have been considered first, as these are generally the most sustainable form of enhancement. The exact monetary cost of a bund is dependent on a number of variables such as the area of land uptake required and whether excess material is available. Noise bunds have only been specified where (as stated above) they are predicted to give a meaningful benefit to residential receptors.
 - Where it is not possible to construct a noise bund in the desired location, noise barriers have been considered. However, in order for these to be sustainable in line with the aims of the NPSE, they must have a 'value for money' score of 1 or greater. This is based on the comparison of the monetised acoustic benefits of a barrier and the cost of installing the barrier. So, where the value for money is 1 or more, the monetary acoustic benefits outweigh the cost of installing the barrier.
- 1.12.21. Where the above tests are not met, enhancement measures are not proposed.
- 1.12.22. The Scheme is deemed policy compliant provided noise mitigation has been considered for receptors with noise levels above LOAEL and where the above three tests are met.

Part A Detailed Calculation Area

- 1.12.23. Noise levels in the opening and future year Do-something scenarios are predicted to exceed the LOAEL at over 445 dwellings and 12 other sensitive receptors (during the daytime in 2024) and enhancement measures must therefore be considered. However, these properties are generally isolated or are not sufficiently close to the Scheme carriageway for a noise barrier or bund to provide a meaningful benefit. For a barrier to be considered value for money (and therefore considered sustainable) it must provide sufficient benefits which are determined by the number of receptors affected, the magnitude of the noise level change and the magnitude of the absolute noise level. Where properties are isolated and at a large distance from the Scheme, a barrier is unlikely to be value for money. As such, for the majority of properties, enhancement is unlikely to be sustainable in the context of the aims of the NPSE and has not been considered further.
- 1.12.24. However, in two locations, noise sensitive receptors are located close enough to the Scheme to experience meaningful benefits from a proposed barrier which would also be likely to be value for money.
- 1.12.25. The first of these is in the area of Northgate Farm and Warreners Cottages. It was noted in the Mitigation section of this Addendum that as Northgate Farm is predicted to experience a significant adverse effect, mitigation has been proposed in the form of an acoustic barrier (PNB1). Whilst only a very short barrier would be required to mitigate the significant adverse effect predicted at Northgate Farm, properties in this area are orientated such that extending the barrier is anticipated to provide meaningful benefits to other residents in the area (i.e. the change in noise is likely to be perceived by residents). Therefore, a 70 m long, 3 m high barrier has been proposed in the area which, given the proximity of receptors in this area to the A1 carriageway a noise barrier would decrease noise levels (by at least 1 dB) at five properties within the area of Northgate Farm and Warreners Cottages (and over 3 dB at three properties).
- 1.12.26. The proposed barrier is also predicted to be value for money, and therefore sustainable in accordance with the NPSE (**Ref.1.7**). It is understood that in this location, further investigation is required to determine whether there is space for the required foundations for this barrier. The barrier would be constructed if it can be built and still meets the value for money criteria in paragraph 1.12.20.
- 1.12.27. The second barrier, which is predicted to provide meaningful benefits in terms of noise reductions, as well as being value for money is in the area of Felmoor Park and Bockenfield Holiday Park.
- 1.12.28. As discussed in paragraph 1.10.8, it is unclear how many of the mobile homes in this area are permanent or semi-permanent residential properties. Mobile homes for holiday lettings have also been considered as a noise sensitive receptor, and most of these would be likely to have noise levels above the LOAEL. Therefore, a noise barrier has been considered in this location (PNB4). Given the density of the mobile homes within the site it is likely that the barrier would be value for money. The predicted benefits as a result of a 3 m high noise

barrier (although this cannot be tested against the value for money criteria, given the aforementioned ambiguity in receptor numbers in the area) are presented in **Figure 12: Noise Level Benefits from PNB4** within **Appendix D: Noise Addendum Figures - Part 2**. It is understood that in this location, further investigation is required to determine whether the barrier can be built. The barrier would be constructed if it can be built and still meets the value for money criteria in paragraph 1.12.20.

- 1.12.29. Noise barriers PNB1 and PNB4 are included in rows A-N24 and A-N5 of Table 3-2 within the Outline Construction Environmental Management Plan (**Document Reference: 7.3**).

Part B Detailed Calculation Area

- 1.12.30. When considering the year of opening (2024) Do-Something scenario within the Part B detailed calculation area, noise levels from the Scheme are predicted to exceed the LOAEL at 33 dwellings and 9 other sensitive receptors during the day, and enhancement measures should, therefore, be considered. These properties are generally also subject to noise levels exceeding the LOAEL within the Do-Minimum scenario.
- 1.12.31. Many of these properties are quite isolated and are not sufficiently close to the Scheme for a noise barrier or bund to provide a meaningful benefit. For those receptors close to the Scheme, calculations have been undertaken to determine the level of noise reduction likely to be achieved by acoustic screening in the form of a barrier of between 2 and 3 m in height. Where it has been determined that a benefit of at least 3 dB may be achieved, value for money analysis has been undertaken. This analysis has been undertaken for barriers located adjacent to the following sensitive receptors:
- West Lodge – one property 68 m to the east of the Scheme.
 - West Link Hall Cottages – five properties to the west of the Scheme at an approximate distance of 45 m.
 - Patterson Cottage – 30 m to the west of the Scheme.
 - Rock Lodge – 65 m to the west of the Scheme.
 - Rock Nab – two properties at 255 m to the west of the Scheme.
 - The Cottages – including 13 properties at distances ranging from 30 m to 90 m from the Scheme.
- 1.12.32. Mitigation appraisals undertaken for the above noise-sensitive receptors identify that barriers would not provide value for money. This is because long barriers are required to achieve meaningful acoustic benefits (at least 3 dB) at single or small groups of receptors.
- 1.12.33. These appraisals have been undertaken to determine whether it is appropriate to progress to more detailed assessments to include comprehensive consideration to barrier length and alignment in view of possible constraints. It has been found that noise barrier mitigation does not represent value for money and so these have been considered no further. In summary, enhancement in the form of noise barriers is considered unsustainable in the context of the aims of the NPSE (**Ref.1.7**).

- 1.12.34. Alongside the appraisal of potential noise barriers, consideration has been given to the implementation of noise bunds at the locations listed above. From this appraisal it has been concluded that at all locations, constraints surrounding the availability of land within the Order Limits, limit the height and extent of possible bunds to such a degree that meaningful acoustic benefits cannot be achieved.

Wider Network Area

- 1.12.35. As operational noise enhancement measures have only been considered where they can be constructed within the Scheme Order Limits, enhancement measures for receptors within the wider network area have not been considered.

1.13 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

OPERATIONAL NOISE

Part A Detailed Calculation Area

Impact of mitigation and enhancement measures on LOAEL and SOAEL thresholds

- 1.13.1. Whilst the four proposed noise barriers and the environmental bunds for other environmental topics do change the numbers of receptors above and below the LOAEL and SOAEL thresholds, these changes are only small.
- 1.13.2. In the short-term during the daytime two fewer dwellings are predicted to exceed the SOAEL and during the night-time one additional property is predicted to be below the LOAEL. In the long-term there are no changes a result of the mitigation and enhancement measures. This does not mean that the mitigation and enhancement measures are not effective as noise levels can change noticeably but still fall within the same noise threshold band.
- 1.13.3. The following sections explore the noise level changes in more detail as a result of the mitigation and enhancement measures. As for the LOAEL and SOAEL thresholds, the noise level changes at the majority of receptors does not change as a result of the mitigation and enhancement measures discussed above, therefore, this section will focus on those receptors predicted to experience significant adverse and significant beneficial effects.

Felmoor Park and Bockenfield Holiday Park

- 1.13.4. As is discussed above, the exact distribution of residential and holiday properties in Felmoor Park and Bockenfield Holiday Park is unclear. As discussed in paragraph 1.12.28 a noise barrier (PNB4) has been proposed, which given the density of the receptors, is expected to be value for money in accordance with the aims of the NPSE (Ref. 1.9)⁸. **Figure 12: Noise**

⁸ This cannot be tested given the ambiguity in the numbers of receptors in the area as discussed in paragraph 1.12.28.

Level Benefits from PNB4 within **Appendix D: Noise Addendum Figures - Part 2** shows that the proposed noise barrier is likely to provide a meaningful benefit for noise sensitive receptors in this area and should be included. **Figure 13: Short-term Noise Level Change for Felmoor Park and Bockenfield Holiday Park** within **Appendix D: Noise Addendum Figures - Part 2** presents the noise level changes predicted to occur as a result of the Scheme with the inclusion of PNB4.

- 1.13.5. As noted in paragraph 1.12.28, whether the barrier can be built in this location cannot be confirmed until the detailed design stage. If the barrier cannot be built **Figure 7: Short-term Noise Level Change for Felmoor Park and Bockenfield Holiday Park** within **Appendix D: Noise Addendum Figures - Part 2** should be referred to in order to understand the predicted noise level changes as a result of the Scheme.

Policy Compliance

- 1.13.6. As noted in paragraphs 1.12.26 and 1.12.28, it cannot be confirmed until the detailed design stage whether barriers PNB1 and PNB4 can be constructed.
- 1.13.7. If the design constraints allow, and the barriers can be built, they should be constructed in order for the Scheme to be deemed Policy Compliant. If PNB1 and/or PNB4 cannot be built because the design constraints do not allow, or to construct the barriers would incur significant costs above those assumed for standard noise barrier construction, the proposed barriers would be unlikely to be value for money. Therefore, in line with the NPSE, the Scheme would still be deemed Policy Compliant if either or both of the barriers are not constructed.
- 1.13.8. Based on the consideration of enhancement measures and noise level predictions, the Scheme is deemed Policy Compliant.

Significant Adverse Effects

- 1.13.9. It is appropriate to re-consider the noise changes as a result of the Scheme including the measures proposed to mitigate significant noise effects (three noise barriers) and the enhancement measures in order for the Scheme to be Policy compliant (one further noise barrier).
- 1.13.10. **Table 1-39** presents a summary of the predicted magnitude of noise level changes with and without the mitigation measures at the ten receptors previously identified as likely to experience significant adverse operational noise effects as a result of the Scheme as discussed in Section 1.12.

Table 1-39 – Predicted Magnitude of Impact at Receptors Likely to Experience Significant Adverse Effects with and without Mitigation

Receptor Group	Property	Proposed noise Barrier	Magnitude of Impact without Mitigation	Magnitude of Impact with mitigation
Group 7	Northgate Farm	PNB1	Minor adverse	Minor beneficial
Group 9	Six receptors in Fenrother	N/A	Moderate adverse	Moderate adverse
Group 10	Joiners Cottage, Causey Park	PNB2	Major adverse	Moderate adverse ¹
	The Cottage, Causey Park		Major adverse	Major adverse
Group 11	New Houses Farm	PNB3	Major adverse	Major adverse

NOTE 1: Following the implementation of mitigation the greatest magnitude of impact at this receptor is major beneficial, however a moderate adverse impact has been presented in this table as those are the impacts at the façades which were causing the significant adverse effect previously. Whilst this property is predicted to experience major benefits on some façades, for this receptor the moderate adverse impacts mean that the receptor is still considered to experience a significant adverse effect. Similar noise level changes are predicted at The Cottage (with a major beneficial noise level change on one façade) although the greatest magnitude of change remains major adverse at this receptor.

- 1.13.11. If PNB1 can be built, the attenuation afforded by the barrier would mean that Northgate Farm is not predicted to experience a significant adverse effect. However, given that it cannot be confirmed until the detailed design stage whether this barrier can be built, this receptor is considered a residual significant adverse effect.
- 1.13.12. As discussed in paragraph 1.12.8, mitigation measures were considered for the significant adverse effects in Fenrother, however, these measures were predicted not to provide a meaningful benefit to residents and so have not been included. Therefore, the six receptors in Fenrother are considered residual significant adverse effects

- 1.13.13. For the receptors in Group 10 at Causey Park, whilst PNB2 is predicted to provide a meaningful noise benefit of at least 3 dB, the attenuation afforded by the barrier is insufficient to prevent these receptors experiencing residual significant adverse effects.
- 1.13.14. For New Houses Farm (Group 11) whilst PNB3 is predicted to provide a meaningful noise benefit of at least 3 dB, the attenuation afforded by the barrier is insufficient to prevent this receptor experiencing a residual significant adverse effect.

Significant Beneficial Effects


- 1.13.15. As noted in **Table 1-30** in Section 1.11, 24 properties and four other-sensitive receptors are predicted to experience significant beneficial effects as a result of the Scheme.
- 1.13.16. It is appropriate to consider whether any of the mitigation or enhancement measures discussed above could give rise to additional significant beneficial operational noise effects.
- 1.13.17. As a result of PNB2, one additional property, Four Gables Bungalow, Causey Park is predicted to experience a significant beneficial operational noise effect as a result of the Scheme. This receptor was previously in Group 2 (non-significant beneficial effect), due to the adverse changes on two façades. However, the barrier reduces the magnitude of these adverse changes such that the receptor is predicted to experience a significant beneficial effect.
- 1.13.18. For Felmoor Park and Bockenfield Holiday Park, Figure 13: Short-term Noise Level Change for Felmoor Park and Bockenfield Holiday Park within Appendix D: Noise Addendum Figures - Part 2 presents the noise level changes predicted to occur as a result of the Scheme with PNB4. The likely impacts range from major beneficial to negligible. Properties predicted to experience moderate or major beneficial impacts in this area are deemed to experience significant beneficial effects.

Significant Noise Effects – Summary

- 1.13.19. **Table 1-40** presents the results of the assessment in terms of significance, including the proposed mitigation measures. Only the receptors predicted to experience significant adverse or beneficial effects have been reported. Given the potential design constraints which might prevent the construction of PNB1 at Northgate Farm and PNB4 at Felmoor Park and Bockenfield Holiday Park, these barriers have not been included in this summary.
- 1.13.20. If PNB1 can be built, Northgate Farm will not experience a significant adverse effect and if PNB4 can be built, some receptors within Felmoor Park and Bockenfield Holiday Park will likely experience significant beneficial effects.

Table 1-40 – Determination of Residual Significance – Part A

Receptor Group (refer to Figure 6: Determination of Significance - Receptor Groups – Part A)	Number of Dwellings / Other Sensitive Receptors	Short-Term Magnitude of Impact (and contextual factors)	Justification of Significance	Significance
Group 1 	24 (4 – School, The Oak Inn, Oakwood Holiday Cottages)	Major and Moderate (Decrease)	The Scheme would improve the noise climate at these properties. As the magnitude of impact is predicted to be moderate or major, the noise level changes are deemed significant.	Significant (Beneficial)
Group 2 ¹ Four Gables bungalow, Causey Park only 	1 – Four Gables Causey Park only	Major (Decrease)	The Scheme (including PNB2) would improve the noise climate at this property, with the majority of façades predicted to experience major beneficial noise decreases. Consequently, with PNB2, this receptor is predicted to experience a significant beneficial noise level change.	Significant (Beneficial)
Group 7 	1 – Northgate Farm	Minor (Increase) (Noise level is above the SOAEL)	This receptor is very close to the road and is predicted to experience noise level changes within the upper end of the minor magnitude of impact category on façades which are also predicted to exceed the SOAEL. The noise level change is, therefore, deemed significant. PNB1 is proposed in the area of Northgate Farm, but it cannot yet be confirmed if this barrier can be constructed. If PNB1 can be built, Northgate Farm is predicted not to experience a significant adverse operational noise effect.	Significant (Adverse)
Group 9 	6 – Fenrother Grange, The Old Barn, Stonebrook Cottage, East Fenrother Farm, and The Cottage and 3 The Cottage (East Fenrother Farm Cottages)	Moderate (Increase)	Whilst the impacts at these receptors in Fenrother could be viewed as broadly similar to other nearby receptors (many of which fall into Group 8), there are some notable differences. Numerically these receptors have a noise level within the mid to upper end of the moderate category and a noise level above the LOAEL at night, but importantly they are located on the eastern edge of Fenrother with views towards the Scheme and given the realignment of the A1 closer to these properties it is considered likely that the acoustic character affecting the receptors could change and that the residents perception of the road traffic noise levels and changes might be enhanced. Therefore, the impacts at these receptors are deemed significant.	Significant (Adverse)
Group 10 	2 - The Cottage and Joiners Cottage, Causey Park	The Cottage - Major (Increase)	These properties are predicted to experience noise level changes of major or moderate adverse magnitude as a direct result of the Scheme. For these receptors this magnitude of noise level change is deemed significant. Whilst they are predicted to experience a noise level	Significant (Adverse)

Receptor Group (refer to Figure 6: Determination of Significance - Receptor Groups – Part A)	Number of Dwellings / Other Sensitive Receptors	Short-Term Magnitude of Impact (and contextual factors)	Justification of Significance	Significance
		Joiners Cottage – Moderate (Increase) ²	change of major or moderate adverse magnitude on one façade, at least one other façade would also experience a beneficial reduction in noise level.	
Group 11 	1 - New Houses Farm	Major (Increase)	This property (New Houses Farm) is predicted to experience a noise increase of major magnitude on multiple façades as a direct result of the Scheme (the A1 is moving around 500 m closer to this property) and this noise level change is, therefore, deemed significant.	Significant (Adverse)

Note 1: Only one of the three receptors in Group 2 (Four Gables Bungalow, Causey Park) is predicted to experience a significant beneficial effect as a result of the Scheme and the proposed mitigation and enhancement measures.

Note 2: Following the implementation of mitigation the greatest magnitude of impact at this receptor is major beneficial, however a moderate adverse impact has been presented in this table as those are the impacts at the façades which were causing the significant adverse effect previously. Whilst this property is predicted to experience major benefits on some façades, for this receptor the moderate adverse impacts mean that the receptor is still considered to experience a significant adverse effect. Similar noise level changes are predicted at The Cottage (with a major beneficial noise level change on one façade) although the greatest magnitude of change remains major adverse at this receptor.

Part B Detailed Calculation Area

- 1.13.21. Given that the Scheme within the Part B detailed calculation area is expected not to result in significant adverse noise effects, it has not been necessary to consider mitigation measures. The assessment of operational effects presented within Section 1.11 therefore still stands.

Wider Network Area

- 1.13.22. DMRB LA 111 also requires that noise level changes are considered on road links other than those physically changed or bypassed by the Scheme.
- 1.13.23. To consider this, the change in BNLs (which are the noise levels at a notional distance of 10 m from the section of road in question) has been determined for road links beyond the Part A and B detailed calculation areas.
- 1.13.24. Significant adverse noise effects have not been identified for the wider area road network beyond Part A and B detailed calculation areas.

1.14 ASSESSMENT PARAMETERS

- 1.14.1. Chapter 2: The Scheme (APP-037) in the ES presents the Assessment Parameters. Table 1-41 and Table 1-42 below consider these in relation to the potential for each assessment parameter to change the conclusions of this chapter.

Table 1-41 – Consideration of Assessment Parameters Part A

Assessment Parameter	Brief Description	Justification
Parameter 1	Change in permanent boundary around Highlaws Junction	This parameter only relates to the land boundaries around Part A and does not include any alterations to the location of the road. As such, it is highly unlikely this parameter would affect the conclusions identified in this Addendum.
Parameter 2	Relocation of Highlaws Junction approximately 47 m north	As this parameter affects the 3D alignment of the Scheme, the potential for changes to the conclusions of this Addendum are discussed in more detail below.
Parameter 3	1 m increase in height of Fenrother Junction	As this parameter affects the 3D alignment of the Scheme, the potential for changes to the conclusions of this Addendum are discussed in more detail below.
Parameter 4	Slackening of environmental mitigation slopes	The environmental mitigation bunds are not providing a significant benefit in terms of their acoustic performance. Therefore, it is unlikely that a slackening of the slopes would alter the conclusions of this Addendum.
Parameter 5	Additional environmental earth bunds	Additional earth bunds are expected not to significantly alter the noise levels at nearby properties. Therefore, this parameter is highly unlikely to alter the conclusions of this Addendum.
Parameter 6	1.5 m off-set to proposed Priest's Bridge Culvert	Location of the culvert is expected not to significantly affect the operational noise or vibration assessment. Therefore, it is unlikely that this would alter the conclusions of this Addendum.
Parameter 7	20 m horizontal parameter for the proposed drainage basin 9	Location of the drainage basin is expected not to affect the operational noise assessment. Therefore, it is unlikely that this would alter the conclusions of this Addendum.
Parameter 8	Movement of underground gas pipe near Burgham Park Underbridge	An underground pipe would have no significance in terms of the operational noise or vibration assessment. Therefore, it is unlikely to alter the conclusions of this Addendum.
Parameter 9	Additional earth bund at West Moor Junction	An additional earth bund in this location is expected not to significantly affect the noise levels at nearby properties. Therefore, it is unlikely to alter the conclusions of this Addendum.
Parameter 10	Horizontal parameter of the proposed River Coquet bridge piers	As the line of route is not changing, a change in the location of the bridge piers is highly unlikely to affect the noise or vibration assessment. Therefore, this is highly unlikely to alter the conclusions of this Addendum.
Parameter 11	Vertical parameter of up to 1.8 m on the parapet height of overbridges	An increase in the parapet height of overbridges is highly unlikely to increase noise levels as a result of Part A. Instead the parapets should provide additional screening to receptors. Therefore, this is highly unlikely to alter the conclusions of this Addendum.
Parameter 12	Horizontal parameter of 10 m to the permanent boundary at Parkwood embankment to allow for a potential berm on the embankment	As the height of the embankment is not changing the acoustic attenuation provided is unlikely to change, it is unlikely this parameter would affect the conclusions identified in this Addendum.

Table 1-42 – Consideration of Assessment Parameters – Part B

Assessment Parameter	Brief Description	Justification
Parameter 1	Up to a 650 mm increase or 250 mm decrease in height for Heckley Fence Accommodation Overbridge has been considered in order to accommodate a 400 mm increase in the depth of the structural beam and a 250 mm increase or decrease in the finished road levels on the A1.	As this parameter affects the 3D alignment of the Scheme, the potential for changes to the conclusions of this Addendum are discussed in more detail below.
Parameter 2	Up to a 900 mm increase or 500 mm decrease in height of Charlton Mires Junction Overbridge has been considered in order to accommodate a 400 mm increase in the depth of the structural beam and a 500 mm increase or decrease in the finished road levels on the A1. Inclusion of a topsoil storage area within the Order Limits surrounding Charlton Mires Junction.	As this parameter affects the 3D alignment of the Scheme, the potential for changes to the conclusions of this Addendum are discussed in more detail below.
Parameter 3	Realignment of the Northern Powergrid Circuit 7.5 km of 66 kV EHV transmission cable may be provided within the new highway boundary, which would entail greater amount of permanent land take, but remove the need to interfere with private land after completion of the works as a result of the operation or maintenance of the cable. This option would mean a slightly different landscaping treatment within the wider highway boundary.	This parameter would not change the assessed road traffic network and therefore would not change the conclusions of the operational stage noise assessments.

1.15 SCHEME CARRIAGEWAY ALIGNMENT LIMITS OF DEVIATION

- 1.15.1. As discussed above, Part A Parameter 2 and 3 and Part B Parameter 1 and 2 are alterations to the 3D alignment of the Scheme and therefore require more detailed consideration with regard to the potential operational road traffic noise impacts.
- 1.15.2. In addition to these, within Article 7 of the Scheme **Explanatory Memorandum (APP-015)** additional LODs are presented for the Scheme relating to the vertical height of the Scheme along the main carriageway and at Fenrother, Highlaws, West Moor and Charlton Mires junctions.
- 1.15.3. Updated 3D general arrangement plans are not available for any of these LODs. Therefore, it is not possible to produce a detailed 3D noise model of the LODs as has been done for the assessment of the Scheme itself presented within this Addendum.
- 1.15.4. For the LODs affecting the vertical alignment of the Scheme, within the 3D noise model the relevant Scheme roads have been raised to the maximum positive extent of the LOD. The maximum positive extent has been used as it is considered likely that a drop in the height of the road would lead to a reduction in noise levels from the Scheme. Whilst such an assessment obviously does not include the effects of any earthworks which would also likely be raised, it can be used to determine the areas or receptors which may need further consideration, should the Scheme heights deviate from those proposed.
- 1.15.5. The changes in noise level as a result of these vertical LODs are generally likely to be small, and would likely not be perceived by residents, however, only very small changes in noise level can affect the magnitude of impact band within which a receptor falls.
- 1.15.6. Part A Parameter 2 involves the re-alignment of Highlaws junction, which is predominantly a lateral movement of the Scheme. The additional receptors which may experience potential significant noise level changes as a result of this parameter are:
- Strafford House
 - Receptors at High Highlaws
- 1.15.7. Should it be considered necessary for the design to deviate from the proposed Scheme 3D General Arrangement alignment (within the limits of the LODs and parameters), it is assumed that the earthworks associated with the Scheme would be re-considered and as necessary re-designed by the main contractor to compensate for the LODs and parameters and to ensure that no additional significant adverse effects would arise.
- 1.15.8. Should the height of the road increase as a result of any of the LODs, the heights of the four proposed noise barriers are also likely to need to increase to ensure that meaningful noise reductions at properties can be achieved from the noise barriers.
- 1.15.9. The requirement for the main contractor to reconsider the noise impact arising from the LODs and parameters and potentially to re-design the earthworks or change the height of the proposed noise barriers is included in the **Outline Construction Environmental Management Plan (Document Reference: 7.3)**.

1.16 MONITORING OPERATION

1.16.1. No monitoring is proposed to support the operational noise assessment.

1.17 CUMULATIVE/NTS/CEMP UPDATES

1.17.1. The conclusions of this Addendum do not alter the conclusions of the cumulative assessments presented in **Chapter 15: Assessment of Combined Effects Part A [APP-060]** and **Chapter 15: Assessment of Combined Effects Part B [APP-061]**. The conclusions of this Addendum supersede the combined within topic effects for noise and vibration presented within **Chapter 16: Assessment of Cumulative Effects [APP-062] paragraphs 16.8.10 to 16.8.23**. All other elements of Chapter 16 remain unaltered.

1.18 REFERENCES

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